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USE OF TEXTILES IN POTTERY MAKING AND EMBELLISHMENT

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Among the native tribes of a wide zone in southern British America and in northern United States and extending from the Atlantic to the Rocky mountains, the ceramic art was intimately associated with the textile art and the earthenware exhibits traces of this intimacy as one of its most constant characteristics. These traces consist of impressions of textile articles made upon the plastic clay during manufacture and of markings in imitation of textile characters traced or stamped on the newly-made vessels. The textile art is no doubt the elder art in this region, as elsewhere, and the potter, working always with textile appliances and with textile models before her, has borrowed many elements of form and ornament from them. Textile forms and markings are thus a characteristic of the initial stages of the ceramic art.

It is true that we cannot say in any case whether the potter's art, as practised in the northern districts, is exclusively of local development, springing from suggestions offered by the practice of simple culinary arts, especially basketry, or whether it

represents degenerate phases of southern art, radiating from far-away culture centers and reduced to the utmost simplicity by the unfriendly environment. We are certainly safe, however, in assuming that this peculiar phase of the art represents its initial stage—a stage through and from which the higher and more complex phases characterizing succeeding stages of barbarism and civilization arose.

Whether the art passed through the textile stage with all peoples may remain a question, for the traces are obliterated by lapse of time. We observe in passing southward through the United States that the textile-marked wares become less and less prevalent, though enough is still found in Florida and other Gulf states to suggest a former practice there of the archaic art and a development from it.

Textile markings found on pottery are of five classes: First, impressions from the surface of rigid forms, such as baskets. Second, impressions of fabrics of a pliable nature, such as cloths and nets. Third, impressions from woven textures used over the hand or over some suitable modeling implement. Fourth, impressions of cords wrapped about modeling paddles or rocking tools. Fifth, impressions of bits of cords or other textile units, singly or in groups, applied for ornament only and so arranged as to give textile-like patterns. In addition, we have a large class of impressions and markings in which textile effects are mechanically imitated.

The several kinds of textile markings are not equally distributed over the country, but each seems, to a certain extent, to characterize the wares of a particular region or to belong to particular groups of ware, indicating, perhaps, the condition and practices of distinct peoples or variations in initial elements affecting the art. There may also be a certain order in the development of the various classes of impressions—a passing from simple to complex phenomena, from purely mechanical to conventionally modified phases of embellishment.

a. Bowl from a North Carolina mound, showing prints of cord-wrapped maleating tool.

b. Bowl made by the author. The surface was finished with a cord-wrapped paddle.

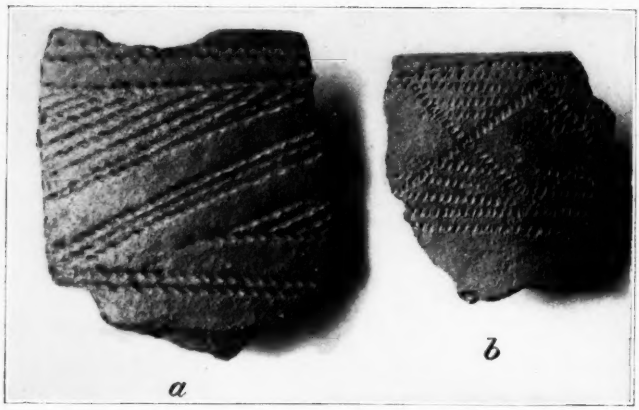
Baskets used in molding and modeling.—The extent to which baskets were used in modeling pottery in this great province has been greatly over-estimated. Instead of being the rule, as we have been led to believe, their use constitutes the exception, and the rare exception.

The functions of the fabrics and textile elements used in connection with the manufacture of pottery deserve careful consideration. There can be little doubt that these functions are both practical and esthetic, but we shall not be able to make the distinction in all cases. Practical uses may be several. In modeling a clay vessel a basket may be used as a support and pivot, thus serving as an incipient form of the wheel (plate VII, *a*). It may equally well assist in shaping the bodies of the vessels, thus assuming in a limited way the functions of a mold. The mat upon which a plastic vessel happens to rest leaves impressions rendered indelible by subsequent firing. The same may be true of any fabric brought into contact with the plastic surface, but the impressions in such cases are accidental and have no practical function.

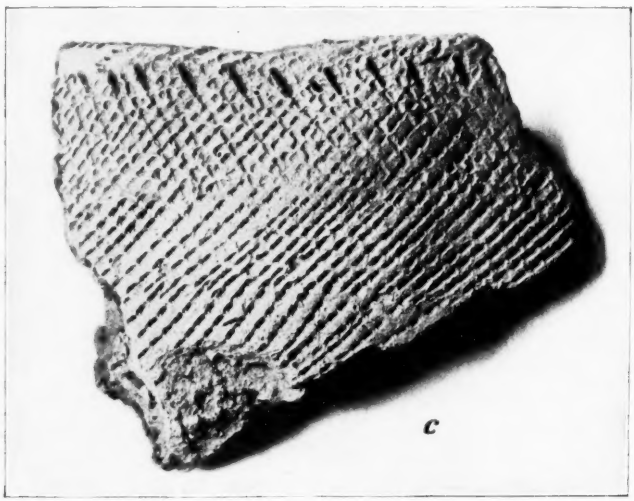
That baskets were used in the east as molds is attested by historical evidence. I can but regard it as remarkable, however, that in handling thousands of specimens of this pottery I have found no vase the imprints upon which fully warrant the statement that a basket was employed as a mold or even as a support for the incipient clay form. Many assertions to the contrary have been made, probably through misapprehension of the nature of the markings observed. On fragments of imperfectly-preserved vessels distinctions cannot readily be drawn between disconnected impressions made by the partial application of pliable fabrics or textile-covered stamps and the systematically connected imprintings made by the surface of a basket. The unwary are liable even to mistake the rude patterns made by impressing bits of cords in geometric arrangement about the rims of vases for the imprints of baskets.

Pliable fabrics as aids in modeling.—Pliable fabrics, such as sacks, nets, and cloths, were made use of as exterior supports in holding or handling the vessel while it was still in a plastic condition. Mr Mooney says that the Cherokee use a rag when lifting the pot at one stage of its manufacture, and it is easy to see that cloths or nets wrapped about the exterior surface of the plastic walls would serve to prevent quick drying and consequent cracking of the clay along weak lines. Binding up with cloths or nets would interfere with the deforming tendency of pressure during the modeling process and of sinking from weight of the plastic walls. Mr Sellers, a very acute observer, believed that the modeling of certain large salt basins was done on core-like molds of clay. In such a case, or where (as observed by Hunter) blocks of wood were used, the cloth would serve an important purpose in facilitating the removal of the plastic or partly dried clay shell and in supporting it during subsequent stages of the shaping and finishing processes. Such removal would probably be accomplished by turning the mold, with the vase upon it, upside down, and allowing the latter to fall off into the fabric by its own weight or by means of pressure from the hands. An excellent example of the impressions made on the surface of vases by fabrics applied in the course of manufacture is shown in plate VII, *b*. The specimen is a small vessel from a mound in Lenoir county, North Carolina.

Textiles used in maleating the surfaces of vessels.—An extended series of experiments made for the purpose of determining the functions of fabrics in pottery making has led me to observe that the imprintings were in many cases not made by textiles used as supports, but were applied wrapped about the hand or a modeling tool as a means of knitting or welding together the clay surface. Experiment shows that the deeper and more complex the imprintings, the more tenacious becomes the clay. Scarifying, combing, pinching with the finger-nails, maleating with engraved paddles, etc., served the same purpose.



Potsherds showing simple method of applying cords in vessel decoration.



Potsherd illustrating the markings of a notched wheel.

Use of flat cord-wrapped maleating tools.—It was further observed, as a result of these investigations, that more than half of the textile markings upon vases are not really imprints of fabrics at all, but are the result of going over the surface with modeling tools covered or wrapped with unwoven twisted cords. This is well illustrated in plate VIII, *a*, *b*.

Plate VIII, *a*, illustrates a small bowl from a mound in North Carolina. The surface is completely covered with deep, sharp markings made by paddling with a cord-wrapped tool applied repeatedly and at various angles. Fig. *b* of the plate shows a similar cup, made of potter's clay by the writer as an experiment. The maleating implement was a Cherokee potter's paddle wrapped with native cord.

Use of cord-wrapped rocking tools.—Of the same general class as the cord-wrapped paddle were other tools, more or less rounded and wrapped with cord. These may have been applied as paddles, but were usually rocked back and forth, the rounder forms being revolved as a roulette. The impressions of the flat paddle are distinguished by the patchy and disconnected nature of the imprints. The rolling or rocking implement was not lifted from the surface, and gave a zigzag connection to the markings.

The rolling or rocking modeling tools had an advantage over the flat paddles where round surfaces were to be treated, and especially about the constricted neck of the vessel. They served the triple purpose (1) of modeling the surface, reducing irregularities; (2) of kneading and knitting the surface, making the walls stronger; and (3) of imparting a texture to the surface that may have been regarded as pleasing to the eye. It is seen, however, that whenever it was desired to add ornamental designs, even of the most simple kind, this cord marking was generally smoothed down over the part of the surface to be treated, so that the figures imprinted or incised would have the advantage of an even ground.

Cords imprinted in ornamental patterns.—Growing out of the

use of cord-wrapped tools in modeling and finishing the clay surfaces is a group of phenomena of great importance in the history of ceramic ornament. I refer to the imprinting of twisted cords, singly and in such relations and order as to produce ornamental effects or patterns. In its simplest use the cord was laid on and imprinted in a few lines around the shoulder or neck of the vessel. Elaborations of this use are imprintings producing a great variety of simple geometric patterns, differing with the regions and the peoples. Connected or current fretwork and curved figures were not readily executed in this method, and are never seen. Two examples of cord-imprinted patterns are shown in plate IX, *a*, *b*. Hard-twisted cords were in most general use, but their markings were imitated in various ways, as by imprinting strings of beads, and slender sticks or sinews wrapped with thread or other unwoven strands.

Imitation of textile characters variously produced.—It would seem that the textile idea went beyond the imprinting of textiles and cords and that textile markings were imitated in many ways, indicating possibly the association of ideas of a special traditional nature with the textile work and kept alive in ceramics by the imitation of textile characters.

Textile effects produced by the roulette.—The notched wheel or roulette was used in imitating cord-like patterns, and this was perhaps an outgrowth of the use of cord-covered maleating tools. This tool was confined pretty closely to one great group of ware—the so-called roulette-decorated wares of the northwest. The potsherd shown in plate IX, *c*, illustrates these markings as applied by the ancient potter.

Textile effects produced by stamps and engraved paddles.—Decorative effects closely resembling those produced by the use of cords and the rocking tool were made by narrow, notched stamps applied to the plastic surface. Connecting directly with this simple stamp work, in which a succession of separate imprintings give the textile effects, is the use of the engraved

modeling-texturing-decorating paddle, so extensively used in the southern Appalachian region.

Owing to the close association of these rouletted, stamped, and incised effects with the textile imprinted groups of ware, I feel warranted in speaking of them as growing directly out of textile practices, although they are not necessarily always so connected, since the use of the stamp may also have arisen from other sources, such as the use of non-textile tools in modeling.

The textile art has thus served in various ways to shape and modify the ceramic art, and the textile technic has bequeathed its geometric characters to the younger art, giving rise to most varied forms of embellishment and no doubt profoundly affecting later phases of its development.

THE CATEGORIES

By J. W. POWELL

In my volume entitled *Truth and Error* I employed deductive reasoning to demonstrate the constancy of speed in the ultimate particle. The method will be justified in this article.

Induction leads to the discovery of laws. The laws themselves may at first be imperfectly understood and improperly stated; often they require revision from time to time as new facts are discovered. When at last the law is fully known and correctly stated it becomes a self-evident proposition. Every finally developed law is an axiom. Laws are objective facts inherent in objective nature; the discovery of these laws is an act of mind which reconstructs them from nature. So-called laws often prove to be fallacies of judgment, and laws as first stated often require restatement, for laws are creations of the mind only for the mind and not for nature. The mental operation is a struggle for natural truths, and the human statement of a law must ultimately conform to the natural law.

The nature of deductive and inductive reasoning will be set forth in a subsequent contribution; here we must be content with the bare statement just made.

A categorical question is one that can be answered by simple affirmation or negation with a "yes" or "no" or a nod of the head. That a categorical question may be asked it must be simply stated, and that it may be answered it must be understood and the facts known. A category is an ultimate fact simply stated, but in order that it be accepted it must be understood and the person who understands it must have the necessary knowledge.

A category is something ultimately simple. The term *simple* is antithetic both to compound and to complex. That is reduced which is changed from a compound state to a simple state, and from a complex state to a simple state, and that is irreducible which can be no further simplified. To understand how compounds are reduced to simples we have to understand how bodies are reduced to particles. Having reduced bodies to their ultimate particles, a further reduction is possible, not by analysis but by abstraction: this ultimate reduction ends in discovering the irreducibles.

Historically the effort to accomplish this end was first vaguely made by considering the nature of language, when the simples which language expresses were called categories or predicaments. This was Aristotle's work. He makes them ten in number, namely: substance, quantity, quality, relation, place, time, position, possession, action, and passivity.

Of this list of categories Mill says:

> The imperfections of this classification are too obvious to require, and its merits are not sufficient to reward, a minute examination. It is a mere catalogue of the distinctions rudely marked out by the language of familiar life, with little or no attempt to penetrate, by philosophic analysis, to the rationale even of those common distinctions. Such an analysis, however superficially conducted, would have shown the enumeration to be both redundant and defective. Some objects are omitted, and others repeated several times under different heads. It is like a division of animals into men, quadrupeds, horses, asses, and ponies. That, for instance, could not be a very comprehensive view of the nature of Relation which could exclude action, passivity, and local situation from that category. The same observation applies to the categories Quando (or position in time) and Ubi (or position in space); while the distinction between the latter and Situs is merely verbal. The incongruity of erecting into a *summum genus* the class which forms the tenth category is manifest. On the other hand, the enumeration takes no notice of anything besides substance and attributes. In what category are we to place sensations, or any other feelings, and states of mind; as hope, joy, fear; sound, smell, taste; pain, pleasure; thought, judgment, conception, and the like? Probably all these would have

been placed by the Aristotelian school in the categories of *actio* and *passio*; and the relation of such of them as are active, to their objects, and of such of them as are passive, to their causes, would rightly be so placed; but the things themselves, the feelings or states of mind wrongly. Feelings, or states of consciousness, are assuredly to be counted among realities, but they cannot be reckoned either among substances or attributes.

This is why I call Aristotle the founder of materialism. He vaguely thought mind to be nothing but Ποιεῖν and Πάσχειν—*actio* and *passio*—nothing but action and reaction. In the same manner Spencer considers mind to be nothing but energy, while many of our modern physiological psychologists take the same ground, that mind is the action and reaction of forces.

The subject of the categories was considered by Kant; he makes them twelve, in four classes of three species, namely—

Singularity	Reality	Substance	Possibility
Plurality	Unreality	Dependence	Existence
Universality	Indefiniteness	Reaction	Necessity

This system has also been found defective. Kant believed the nature of mind to be insoluble,—to be the mysterious "noumenon,"—while he classified the faculties into intellections, emotions, and will, and then divided intellection into sensibility, understanding, and reasoning. This method of treating the subject led him into immeasurable absurdities which found expression in the statement that the mind can only reach antinomies or contradictions. That metaphysic known in modern times as idealism, which was founded by Berkeley, now affirms that the whole universe is the construction of mind which has no objective reality. Mind is the only reality. By this system mind is the single category, just as energy is the single category with Spencer.

Science considers the objective world and discovers the simples of which it is composed. These simples, these categories, these predicaments, are the irreducibles. Thus we have

the irreducibles considered as predicaments from the standpoint of language, as categories from the standpoint of psychology, and as simples from the standpoint of objective science. All of these words have the same significance.

Now I shall attempt to derive a new set of categories from the standpoint of science.

How Bodies are Resolved into Particles

First I must set forth how bodies are reduced to particles.

Simples are made compound by incorporation through organization, for that which is incorporated is organized, and that which is organized is incorporated. Incorporation and organization are views of the same thing from different standpoints. We look at the thing from the standpoint of incorporation when we consider it as one thing, and we look at it from the standpoint of organization when we consider the many things of which it is composed, but the many are one and the one is many. Incorporation and organization are therefore postulates one of the other.

Particles are organized into bodies and every particle of the organized universe is incorporated in a hierarchy of bodies. When many are organized into one we consider the one as a body, but we consider the many severally as particles. When we speak of bodies we call their production incorporation, but when we speak of particles we call their production into bodies organization. Bodies are incorporated of particles; particles are organized into bodies.

Ultimate particles are found in nature to be organized into five grand classes, as taught by modern science. There are molecular bodies, star bodies, rock bodies, plant bodies, and animal bodies. The unorganized particles constitute the ether, and the artificial organization of men into bodies politic constitutes demotic bodies.

In astronomy the universe is reduced to stellar systems, and

stellar systems to individual stars. In rocks, plants, and animals a reduction into simpler elements can be made by dissection, or with the microscope, but the ultimate reduction of all bodies to molecular particles is accomplished by chemical analysis.

Molecules are also reduced to simpler elements sometimes called atoms. All the bodies of the earth can be reduced to about seventy such elements, and many of them are found to exist in the stars. By chemical and physical research laws are found which lead chemists and physicists to believe that the so-called elements or atoms are themselves compound bodies. At the present time knowledge is limited in the direction of the minute as it is in the direction of the vast.

The ultimate simplicity of the particle stands upon the same experimental and logical foundation as does the ultimate system of the stellar universe.

The ultimate simplicity of atoms as particles has not been inductively established; but the multitudinous and diverse bodies of the world have been reduced to a very small number, and relations have been discovered that can be explained only upon the hypothesis of their reduction to unity by further analysis, just as astronomical research has not yet inductively discovered a completely unified system of stars. The unification of the stellar system and the unification of the molecular system stand upon the same inductive basis. The work has progressed in the direction of unification almost to the verge of the infinitesimal and the infinite, as these terms are used by science, and the facts already discovered in this borderland of research can be explained only by assuming ultimate unification — one kind of ultimate simple particle, one ultimate system of stars; thus both of these propositions have been deductively established.

I have stated in a brief manner how the bodies of the universe are reduced to particles by telescopic and microscopic resolution and by chemical analysis, and the progress which has been made in this work by resolving them inductively and experimentally

into a very few, and that we have reason to believe they are compounded of one kind of ultimate particles, all organized into one ultimate stellar system. This is what I understand to be the monism of science.

The method of resolving bodies into particles I call *analysis*, and the proof of analysis is synthesis. I use the term analysis with a specific meaning, to distinguish it from abstraction. The proof of abstraction is concretizing.

How Concrete Objects are Resolved into Abstract Objects

Here I must first demonstrate that the abstract is always more simple than the concrete.

An object stands upon the table. I do not know what it is, and I first look at it and see its color in chiaroscuro, but I have learned how to interpret this color as a representative of form; this is the doctrine taught by modern psychology. I strike the object with my pencil, and discover the sound which it makes; I also interpret this sound as a mark of another element of its form, and I find that the object is hollow. I lift the object and find it is not heavy, and I further interpret this sensation and conclude that it is painted wood. I touch it and learn that it has a lacquered surface, and then smell it in examining the vapor which it exhales. Now I am ready to affirm that the object is a painted wooden bottle which has contained some odorous substance.

In this manner the concrete object is cognized by making a combination of its abstract attributes. Thus the humblest worm obtains all its knowledge of the objective world by combining abstractions. Every animal with the best developed organs of sense cognizes by abstracts, and then combines these abstracts to cognize concretes. Concretes are cognized by concreting abstracts. This is a universal law.

An ultimate particle can be resolved still further by abstraction. It is found that certain things are essential to it; that it

cannot exist without these essentials, and that if one should be taken away the particle itself would be annihilated.

The ultimate particle must be an abstract unity. If the one could be resolved into many it would not be ultimate. If the one were annihilated the particle would be annihilated. Ultimate unity is essential to the existence of the ultimate particle.

The ultimate particle must be extended. If the extension were transmuted into unity, the particle would be annihilated; if unity were transmuted into extension, the particle would be annihilated. The unity and extension belong to the same particle. A unit without an extension is nothing; an extension without a unity is nothing; it must be one and extended.

The ultimate particle must have speed. Every particle of the universe known to man has motion. Every particle organized into a body must have the motion of that body, and every particle of organized matter exists in a hierarchy of bodies. The particle in the rock has its motion as heat, its motion in rotation on the earth's axis, its motion in revolution about the sun, and its motion in all the other bodies of the hierarchy. All bodies have motion and all particles of the ether have motion, but this motion is speed and path. The ultimate particle must have speed; we will consider its path hereafter. It is manifest that the speed of the particle cannot exist without the extension, and that the extension cannot exist without the speed anywhere in this universe. Speed is not extension, and extension is not speed. Speed cannot be transmuted into extension; extension cannot be transmuted into speed, but speed is essential to the particle.

Every particle must have persistence or continued existence, else the particle would be annihilated. The particle cannot come from nothing or go into nothing. The persistence cannot be transmuted into speed, nor can the speed be transmuted into persistence.

The particle must have not only unity, extension, and speed,

but it must have persistence; persistence is therefore essential to the particle.

Every particle must have affinity if it exists in a body, for the particles of every natural body are held together by affinity, and no body of particles without affinity has yet been discovered. Affinity implies choice of association, and choice of association implies proto-consciousness, therefore every particle must have proto-consciousness as one of its essentials. Consciousness is not persistence, consciousness is not speed, consciousness is not extension, consciousness is not unity; but the particle has unity, extension, speed, persistence, and the proto-consciousness of affinity.

I have affirmed that every particle must have five essentials, but it must not be understood that they are possessions with which it can part. The particle is a unit, an extension, a speed, a persistence, and a proto-consciousness. Here is a squirrel playing under the tree by my window. It has a head, body, legs, and tail. It cannot part with its head, body, legs, and tail and still remain a squirrel. It cannot part with its metabolic organs, nor with its circulatory organs, nor with its muscular organs, nor with its reproductive organs, nor with its neural organs and still remain a squirrel; and if dissected it is but fragments of a squirrel undergoing dissolution because its organization is destroyed. But these are concrete parts of a squirrel that still remain as particles of matter after the squirrel has been disorganized, while the particle has abstract essentials to its existence with which it cannot part without annihilation. The ultimate particle does not depend on organization, but its essentials are inherent.

Every particle consists of five essentials. They are concomitant and cannot exist apart from one another. They are, as essentials, totally unlike one another and must therefore always be clearly distinguished. One essential cannot be derived from another. Unity cannot become extension, extension cannot become

speed, speed cannot become persistence, persistence cannot become proto-consciousness; but one particle must be a unit, an extension, a speed, a persistence, and a proto-consciousness. As one body may be composed of many particles, so one particle is composed of many abstract essentials. The one is many and the many are one—many abstract essentials in one concrete particle.

Thus bodies are resolved into particles to get concrete simples, but the particles themselves may be further resolved into abstractions which I have here called essentials.

The ultimate particle in its essentials is absolute in that it does not depend on other particles for these essentials, but they inhere in itself without the aid of others. I shall therefore call these abstract essentials *absolutes*, and I shall define the term thus: An absolute is something which is independent of other things for its existence. It exists in itself. I use the term *thing* as the universal noun for all abstract or concrete objects, and I use the term *entity* for all concrete things only.

The pentalogic absolutes are concomitant in every particle; they cannot be taken from it, nor can a new absolute be added to it.

Thus I have demonstrated one pentalogic group of abstract simples as the absolutes of an ultimate particle of matter.

Relations

A relation must exist between two or more terms. The terms may be ultimate particles; but if one ultimate particle is related to another, then the five absolutes in one must be related to those of the other severally. The unity must be related to the unity, the extension to the extension, the speed to the speed, the persistence to the persistence, and the proto-consciousness to the proto-consciousness. A relation is a condition between two or more terms in respect to some connection between them.

Plurality.—One does not depend upon another for its unity, but the *one* may be an element in a plurality of *three*. The re-

lation is that of likeness. It is taught in primary arithmetic that you cannot add unlike things. The three constitute a plurality. A plurality is thus a number of units related to one another in respect to some likeness.

There are many ultimate particles; neglecting the ether, all others are organized into bodies. There are many bodies, each constituting a unity of a plurality. Thus we have natural units of different orders, the plurality itself being an incorporated unit. The body is organized of a plurality incorporated in a unity. Unity is the absolute on which plurality is founded. Plurality is therefore the relative of unity.

Position. — Extension as an absolute has position for its relative. Position is the relation existing between two or more particles in respect to their mutual directions from one another and their mutual distances from one another. There is thus a double or polar direction from one particle to another, one being the opposite of the other, but the distance is the same. Considering the simplest relation of position as that which may exist between two particles, position is their mutual relation in respect to direction and distance.

Path. — Speed as an absolute in the ultimate particle has path as its relative, for the path is dependent upon others. It is taught in physics that any particle or body will have its motion directed in a straight line from which it will not deviate, nor will it increase or diminish its velocity unless it is interfered with by another particle or body. Two ultimate particles may interfere with each other by collision, when the path of both will be changed. In the case of the collision of bodies they will be mutually deflected, even to the extent of reversing the direction of molar motion, but neither one will increase nor diminish its speed, but all of the particles of both bodies will be deflected. Path, therefore, is the direction taken by an ultimate particle as determined by its collisions.

Change. — The persistence of an ultimate particle as an

absolute has change as its relative, for it is dependent upon others. Change is a relation between terms. In this case the terms are persistence and the relations are changes. The relation of a change is a relation in respect to sequence, and the relation of sequence in ultimate particles is the relation of cause and effect, but in the simplest case there are two causes and two effects. Let us call cause and effect *causation;* then causations are mutual in relations of causative sequence. Therefore change is a relation with respect to causation.

Choice. — Consciousness in the ultimate particle as an absolute has choice as a relative, for choice is the choice of others. Consciousness is awareness of self. Choice of one another in ultimate particles is affinity which implies proto-consciousness. The choice is always made for a purpose; therefore choice is the relation of selection for a purpose.

Remark: The will of all animal life can be resolved into the choice of ultimate particles.

Thus I have demonstrated a second pentalogic group of simples or categories.

The relations when reduced by abstraction to ultimate simplicity are found to be plurality, position, path, change, and choice. For every relative there is a corresponding absolute upon which it is founded. Unity is the foundation of plurality, extension is the foundation of position, speed is the foundation of path, persistence is the foundation of change, and consciousness is the foundation of choice.

Absolutes are Constant and Relations are Variable

The ultimate particles of the universe are constant, hence the essentials of these particles are constant; but these essentials are absolutes, hence all absolutes are constant.

The one of an ultimate particle remains one forever; it is constant. The ultimate units of the universe constitute a totality. This totality is broken up into many variable pluralities. Thus

we have molecules of different orders, which are bodies of different orders, and some may be dissolved while others may be formed. Not only molecules but all other bodies may be constituted and destroyed, reconstituted and redestroyed to an infinite degree. Thus pluralities are variable.

The extension of every particle is the same and constant, but the position of every particle is variable, for severally they are in motion and the direction of these motions and their distances apart are forever changing; thus the position of every particle to others is variable.

The speed of every particle is the same and constant, but the path of every particle is variable from a straight line, for its path has components in every body in which the particle exists. The path of every particle is variable from a straight line, being in fact a vortex path.

Remark: That which we call acceleration of molar motion is wholly deflection of particles and is not acceleration of speed.

Notwithstanding the acceleration of molar motion appears to the eye as acceleration of molar speed, this is not true of the ultimate particles. The seen speed of a molar body may be made to begin, increase, diminish, and end by deflecting the unseen speed of its particles. A molar body lying upon the table may seem to be at rest, yet we know that it is in motion with the earth and with the solar system; in like manner we know that it has molecular motion, and these motions must all be deflected if it is given molar motion. If we call the motion of a particle of matter in its hierarchy of incorporations vortex motion, as it was called by Descartes, then molar motion may be given to a body by deflecting its vortex motion. Though I have elsewhere demonstrated that the speed of the particle is constant, I here show that it is a self-evident proposition. The persistence of every particle is the same and constant, while change is variable. This statement is self-evident.

Consciousness is constant, but choice is variable. This proposition has already been demonstrated.

Quantities

We have found that absolutes are constant and that relations are variable. On these absolutes and relations quantities are founded; every particle, whether ultimate or compound, has quantity. The quantities are number, which is unity and plurality; space, which is extension and position; motion, which is speed and path; time, which is persistence and change; and inference which is consciousness and choice, the inference being that a purpose will be subserved.

The space with which science deals must here be distinguished from the space of metaphysic. Science deals with a space composed of parts of extension, metaphysic deals with a space of void. The savage does not know of the existence of the atmosphere; he considers the floor of the earth to be domed with a firmament so as to constitute the tabernacle of the world—an unoccupied region, a void, a theater for animals and ghosts. We still retain the vestiges of this primeval doctrine when we consider space as void. Science does not proceed on the theory of void space, but of unconsidered space. Descartes banished such space from science.

Abstraction is a method of consideration. Metaphysic has a way of expressing the act of abstraction which yields an absurdity. Instead of saying that an attribute is selected for consideration, it says in effect that absolutes are taken from a concrete object until only the object remains to be considered; the object is then a nothing — a void.

Certain attributes of an object can be changed; thus the body that is cold may be made warm. But when the attributes of a body are resolved into categorical elements, one cannot be taken away without annihilating the object, nor can all attributes of a body be abstracted and leave anything to be considered.

Remark: Inferences of void space have never been verified, and thus become cognitions; but as these inferences are habitual and hereditary, the concept is not easily obliterated from the mind. The origin of the concept seems to come from savagery when the sky was considered as a firmament and the earth as the floor which inclosed a void space. This we now know is a pseudo-concept, yet it was confirmed by another when void minute spaces were conceived to exist. By the Greeks the ultimate particle was conceived to be round and rigid or hard, and the universe made up of round, hard particles would have interspaces. Now we must conceive that the ultimate particles are neither spherical nor rigid, but that they have extension, which may be deformed. Thus they may exist together in some other method of extension which may be deformed. Thus space is continuous without void. Yet there is another pseudo-concept which seems to mitigate against this doctrine when motion is considered as existing in void space. When space is considered as continuous, then motion must be considered as existing in continuous space. To clearly conceive this we must give an illustration:

A hollow cylinder may be conceived as being filled with smaller cylinders which touch one another without intervening voids; thus one cannot move without all moving. In the same manner we must conceive that the ultimate particles touch each other without intervening voids, but in order that one may move all must move with like and constant speed. One particle therefore cannot move unless all move. This conception harmonizes with the space of scientific teaching and also with the motion of scientific teaching.

Number is totally unlike space, space is totally unlike motion, motion is totally unlike time, and time is totally unlike inference. Every one is totally unlike every other one. Space cannot be transmuted into number, motion cannot be transmuted into space, time cannot be transmuted into motion, and inference cannot be transmuted into time. No one of these quantities can be

transmuted into any other one; that is, they are wholly unlike one another and wholly underived one from another.

Thus we have demonstrated a third pentalogic group of simples or categories.

Properties

Particles constitute bodies, and we may consider them severally as particles or conjointly as bodies. From the standpoint of particles, quantities are involved; from the standpoint of bodies, properties are involved. Properties are founded on quantities, quantities are founded on relations, and relations are founded on absolutes.

Passing from the consideration of these particles to the consideration of bodies, number is considered as class, space is considered as form, motion is considered as force, time is considered as causation, and inference is considered as conception. This may be stated in another way: In the process of organizing particles into bodies, number becomes class, space becomes form, motion becomes force, time becomes causation, and inference becomes conception. Thus there is an objective reality corresponding to the subjective reality. The quantities still remain as quantities if we consider the particles, but the properties appear if we consider the bodies. For example, here are ten hollow cylinders or pipes, but they are organized into a gas stove. If we consider the pipes they are of cylindrical form, but the stove is not cylindrical. There are many attributes of the pipes which are not the same as the stove. Water is composed of oxygen and hydrogen, but there are attributes of water which are not found in oxygen and hydrogen severally. Vessels will float on water, but not on oxygen or hydrogen gas.

Number and class are reciprocal; space and form are reciprocal; motion and energy are reciprocal; time and causation are reciprocal, and, finally, inference and conception are reciprocal; that is, number in the particles becomes class in the organized body; motion in the particles becomes energy in the organized body;

time in the particles becomes causation in the organized body, and inference in the particles becomes conception in the organized body.

As absolutes are wholly unlike one another and cannot be derived one from another, and as relations are wholly unlike one another and cannot be derived one from another, and as quantities are wholly unlike one another and cannot be derived one from another, so properties are wholly unlike one another and cannot be derived one from another.

Thus we have demonstrated a fourth group of simples or categories.

Qualities

Particles and bodies inspire purposes when they are considered as good or evil. This gives rise to qualities. A quality is the good or evil of a property, quantity, or relation of a particle or body for a purpose had in view. Qualities are founded upon absolutes, relations, quantities, and properties, for these are necessary to qualities.

Qualities are grouped by purposes, and these are five-fold, viz., pleasure, welfare, morality, expression, and opinion.

All qualities are good or evil, and are thus antithetic or positive and negative. Thus pain is antithetic to pleasure, illfare is antithetic to welfare, morality is antithetic to immorality, expression has its antitheses in truth and error, while opinion has its antitheses in wisdom and folly.

These purposes give rise to five arts; they are esthetics, industries, institutions, languages, and instructions.

Pleasure, welfare, morality, truth, and wisdom are totally unlike one another, and they are totally underived one from another, yet they are concomitant in every effect on men and in every human act. There can be no pleasure or pain that is not also welfare or illfare. There can be no welfare or illfare that is not also moral or immoral. There can be no morality or immorality that is not also expressed as truth or error, and there

can be no expression that is not also opinion as wisdom or folly.

Although these categories are disparate, yet they are interdependent. There is pleasure in welfare, pleasure in morality, pleasure in expression, and pleasure in opinion. There is welfare in pleasure, welfare in morality, welfare in expression, and welfare in opinion. There is morality in pleasure, morality in welfare, morality in expression, and morality in opinion. There is expression of pleasure, expression of welfare, expression of morality, and expression of opinion ; and finally there is opinion about pleasure, about welfare, about morality, and about expression. They are thus doubly concomitant.

Thus we have demonstrated a fifth group of simples or categories.

The categories which we have thus demonstrated are grouped as absolutes, relations, quantities, properties, and qualities. These rubrics we call *secondary categories*, and the categories into which they are resolved, *primary categories;* that is, there are five groups of secondary categories, every one composed of five primary categories.

Secondary categories constitute an ascending series. There can be no relations without absolutes; no quantities without relations and absolutes; no properties without quantities, relations, and absolutes; and no qualities without properties, quantities, relations, and absolutes. The series is ascended, for the upper is constituted of all the lower.

It will be found useful and important that we should give names to each group of the primary categories. Unity, plurality, number, class, and pleasure we shall call the unit categories. Extension, position, space, form, and welfare we shall call the extension categories. Speed, path, motion, force, and justice we shall call the speed categories. Persistence, change, time, causation, and expression we shall call the persistence categories. Consciousness, choice, inference, conception, and opinion we shall

call the consciousness categories. Thus we have unit categories, extension categories, speed categories, persistence categories, and consciousness categories.

These categories are all unlike one another, and hence they are not classes. A class is founded upon likeness, and degrees of likeness make different classes, while categories are founded on unlikeness. Categories are abstractions; classes are concrete things or entities. These are fundamental distinctions between class and category.

Classification is not abstraction. Berkeley was the first to set forth this doctrine, if my reading serves me well. The concept of a horse is not an abstraction, and the concept of any horse or all horses is not an abstraction. The concept of a class includes all of the class. The concept of vertebrates includes all of the vertebrates with all of their attributes. Every individual vertebrate animal has more attributes or marks than those which are common to all vertebrates, for it has its own peculiar marks which distinguish it from all other members of the class. This is true of every individual vertebrate, and the sum of the individuals which constitute the class have the sum of the characters which the individuals possess. Mammals, birds, reptiles, batrachians, and fishes are all vertebrates, but every such class has characters peculiar to itself which distinguish it from other groups. Yet one bird has all the characters which make it a bird and all the characters which make it an individual, and the class of birds have all the characters of the individual members of the class, and there does not exist any concrete being having only the attributes common to all birds.

The rule of formal logic that the intension of a class term is inversely proportional to its extension is invalid, because it is a pseudo abstraction. The mental act of generalization is totally distinct from the mental act of abstraction. What is valid is this: When we consider a kind in one of a series and discover an attribute in it, we expect to find that attribute in every other

member of the series; or, knowing the attribute in one of the series, we seek to find it in the others, and only those attributes common to the series are considered as marks of the class.

Laws are applicable to classes of bodies inversely proportional to the extent of the class.

A bad habit of speech may result in a fallacy of thought. In the evolution of language this phenomenon is often found. Max Müller, in one of its manifestations, has called it a disease of language. Metaphysic has inherited this disease. The ancients thought categories to be distinct entities; that is, they reified categories, and it was very natural for them to speak of matter and energy as if they were separate existences; it was also natural for them to speak of mind and body as if they were separate existences, for they firmly believed in the ghost notion. This habit of speaking of mind and body, or of force and body, or of mind and force and body, or of matter and mind and force, was legitimate to the primitive mind. Of course we may still continue to speak of matter and mind, of matter and cause, of matter and force, of matter and form, or of matter and class; but he who really understands the nature of the categories in their concomitance will understand it as a faulty method of expression. It is a false method of expression to speak of a particle or body and one of its categories as if they were distinct entities.

Abstraction is not symbolism, with which it is sometimes confounded. A verbal symbol is a representative of a concept, while a concept is a subjective representative or symbol of an objective phenomenon, but the act of abstraction is totally different. Abstractions may be symbolized and concretes may be symbolized; particulars may be symbolized and generals may be symbolized; but we must properly distinguish between abstraction, symbolism, and generalization.

The Development of Attributes

Let us next consider the development of attributes by organization.

Attributes are evolved when particles become bodies. Thus particles of chlorine and particles of sodium become common salt, and salt has attributes additional to that of chlorine and sodium. The particles of common soda are sodium and carbon. Sodium is a white metal, and carbon is a gray graphite which, when crystallized, is the diamond. Thus the particles have their own attributes while the bodies have additional attributes.

The law may be stated thus: Particles in becoming bodies have additional attributes.

Now I wish to show how the abstracts which we call categories are developed when particles are organized into bodies.

Units.—Number is unity and plurality. When ultimate particles are organized into bodies, number becomes class, for a new class is constituted, while the unity becomes a kind and the plurality becomes a series of this kind. Or otherwise stated, the particles in number are all alike; hence they have no class, for a class involves likeness and difference, but a body is a class like other such bodies but different from its particles. Class begins with the incorporation of bodies from ultimate particles. When one class is organized with another, as molecules with molecules, by affinity, then class is organized with class and a third class is produced with additional attributes, and this process may continue to the limit of the organization of classes, and with every class formed new attributes will appear. Thus attributes of class are greatly multiplied. We may formulate this law:

I. As kinds are multiplied by organization, attributes are correspondingly multiplied.

Extension.—Let us again consider particles and bodies in respect to the organization of extension, which is the second absolute category. Space is extension and position. By organization space becomes form, because the extensions of the particles become the figure of the body while the positions of the particles become the structure of the body. Otherwise stated: The particles in space have no figure but their own, but the

particles in the body have a new figure. The particles in space have no structure but their own, but the particles in the body have a new structure.

When forms have been produced they may be organized with other forms by gravity in an ascending series of compound forms, and with every such organization additional attributes will appear. Hence we may formulate the law:

II. As forms are multiplied by organization, attributes are correspondingly multiplied.

Speed.—Let us again consider bodies and particles in respect to the organization of speed, which is the third absolute. Motion is speed and path. By the organization of motion into force, speed becomes inertia or resistance to deflection, while path becomes velocity.

When a body is in motion in a straight line and another impinges upon it from the right or left, it is deflected; if the other body impinges upon it in the direction of that line from ahead it is turned back, or at least checked in its velocity proportional to its mass; if the impinging body strikes it from the rear, its velocity is increased. In all of these cases the change in the molecular motion of the body is the deflection of its particles. Here we must remember that the particles are deflected in all their components of path in vortex motion.

When forces have been produced, they may again be organized with other forces by pressure in an ascending series, and with every new force additional attributes will appear. Hence we may formulate the law:

III. When forces are multiplied by organization, attributes are correspondingly multiplied.

Persistence.—Let us now consider the same particles and bodies with respect to persistence, which is the fourth absolute category. The ultimate particle, which has persistence as an absolute, also has change as a relative. Persistence and change constitute time. When time is organized, it becomes causation,

and the persistence becomes state and the state becomes event. When causation is organized with causation it becomes reproduction, while state becomes heredity and change becomes variation. Reproduction with heredity and variation are abstracts of the concrete known as parent and child. Causations may be partially organized when the parent becomes a number of offspring. This is fissiparous reproduction; but the complete organization of causations requires bisexual conjugation. Causation may be organized in an ascending series of bodies, and at every organization additional attributes will appear. We may formulate the law:

IV. When causations are multiplied by organization, attributes are correspondingly multiplied.

Consciousness.—Yet we have to consider the same particles and bodies from the standpoint of the fifth absolute.

When particles are organized into animate bodies, inference becomes conception, because consciousness becomes memory and choice becomes recollection. This is only primary conception. When concepts are organized with concepts, secondary concepts are developed and thus concepts are still further multiplied. Hence the law may be stated thus:

V. When concepts are multiplied by organization, attributes are correspondingly multiplied.

There is yet one more organization to be considered. This is a conventional organization of men or other animals into demotic bodies to accomplish purposes. By this method material bodies are not developed, but only ideal bodies. It has sometimes been called super-organization, but I shall call it *demotic organization.* It is but the continuation of the organization which begins with the forming of bodies from ultimate particles by affinity, but now it is the ideal organization of individuals into demotic bodies.

The fundamental demotic bodies exist in a hierarchy of units, so that every individual exists in an ascending series; for

example, the man may exist in a township, and by reason of that he exists in a county, and by reason of that he exists in a state, and by reason of that he exists in the nation. But there are many ancillary societies to which he may belong. His ecclesiastical societies may be organized into a hierarchy of bodies. He may belong to various industrial organizations, to various organizations for pleasure, or, in fine, to any one or many of the organizations which men devise to accomplish their purposes.

Through every demotic organization attributes are multiplied. These attributes we call qualities. All qualities are good or evil and they depend upon the purposes entertained; thus purpose informs all the actions and activities of the universe.

When demotic bodies are organized, an entirely new class of concepts are evolved; they are concepts of qualities which are good or evil. They are properly grouped in five divisions as concepts of pleasure and pain, concepts of welfare and illfare, concepts of morality and immorality, concepts of truth and error, and concepts of wisdom and folly. This further multiplication of concepts gives rise to a vast multitude of attributes which must be considered as the most important factor in the totality of those we assign to bodies.

The Fundamental Classes of Bodies

The physical bodies of the universe are incorporated in an ascending series by discrete degrees of organization. A part of the ultimate particles of the universe is organized into molecules being integrated by affinity. Of the molecules that are incorporated, a part only remains in this condition without further organization. The larger part of these gases is contained in nebulæ. The study of nebulæ I shall denominate the science of *nephelonomy*.

Another part of the molecules is organized into stars, but the stars are composed of fluids in which the molecules are organized into forms. Forms do not appear in gases, but are first

evolved in fluids and under gravity they assume the spheroidal form; but the fluid portion of the stars is surrounded by a gaseous envelope. Stars are therefore both fluid and gaseous; they are thus integrated by affinity and gravity, and differentiated as classes by chemism and into spheres by heat. Thus forms are organized of classes and these forms are again organized with classes that remain without form.

A still smaller part of the incorporated molecules are organized as forces in the planets and their satellites. Thus the planets have a higher organization than the stars. The planets are incorporated spheres with a fluid nucleus or centrosphere enveloped in a lithosphere, outside of which there is a hydrosphere and outside of this an atmosphere. The molecules of the planet are primarily integrated by affinity, further integrated by gravity, and still further integrated by lithifaction; and they are differentiated by chemism, heat, and pressure. I call this science *geonomy;* but at the present time we can as a certitude speak only of the earth, though we may, with some show of reason, infer that the other planets of the solar system and other celestial spheres which are not stars have a like organization.

A still smaller part of the molecules are organized into plants. The bodies incorporated still require gas for their environment which they incorporate, they still require a fluid which they incorporate, and they still require solids which they incorporate. They have leaves which they spread in the air for the gas, and they have roots which gather the moisture and penetrate the solids; and the plants themselves are gaseous, fluid, and solid. They develop a mode of motion which is called life. This is all accomplished by their organization of times into causations and of causations with causations to evolve reproduction. I call the science of these bodies *phytonomy.*

A still smaller part of the molecules of the universe are organized into animals. The bodies incorporated require for their organization plants in their environment which they devour; they

require solids in their environment which they also devour; they require fluids in their environment which they drink, and they require gases in their environment which they breathe; and in the bodies themselves gases, fluids, solids, and plants are developed, and life is exhibited in their constitution. This organization is dependent upon the higher organization of mind, when concepts are organized from inferences and concepts are organized with concepts. I call the science of these bodies *zoönomy*.

There are five states of organized matter — gaseous, fluid, solid, vital, and mental. There are five systems of bodies that are organized out of these states of matter: they are molecules, the science of which is nephelonomy; stars, the science of which is astronomy; secondary celestial spheres, the science of which is geonomy; plants, the science of which is phytonomy; and animals, the science of which is zoönomy. In addition to this there are the ultimate particles exhibited in the ether, the science of which I call *ethronomy*, and there are ideally organized bodies, the science of which I call *demonomy*. Thus that which has been established by induction I have established by deduction. In the history of the development of science induction precedes deduction.

I have thus demonstrated that all natural and conventional or human organization is inspired by purpose. In this stage it is legitimate to inquire, What purpose?—to which the ready answer can be given, The betterment of condition. Until mind was organized in the animal world, this was accomplished by spontaneous choice on instantaneous occasion; but when mind was organized with memory, purpose was developed into design, or predetermined purpose. The purpose was betterment and the agency for betterment has always been coöperation.

Remark: The fundamental law of evolution is the law of affinity; but there are ancillary laws by which evolution is accelerated; the first was demonstrated by Laplace, though not named by him; it is the law of adaptation to environment. The second

ancillary law was demonstrated in my volume entitled *The Geology of the Unita Mountains;* I named it "the instability of the heterogeneous." The third law was by Darwin, and it may be called the "survival of the fittest." The fourth law was demonstrated by Lamarck; it is the law of exercise. The fifth law was demonstrated by myself in 1883, and it is the law of culture. Thus evolution by affinity has been progressively accelerated.

Below are tabulated the twenty-five categories:

	Unit categories	Extension categories	Speed categories	Persistence categories	Consciousness categories
Absolutes.....	Unity	Extension	Speed	Persistence	Consciousness
Relatives.....	Plurality	Position	Path	Change	Choice
Quantities.....	Number	Space	Motion	Time	Inference
Properties.....	Class	Form	Force	Causation	Conception
Qualities.....	Pleasure	Welfare	Morality	Truth	Wisdom

By a careful inspection of this table it will be seen that no one of the twenty-five attributes is like another, that no attribute in one column can be derived from an attribute in another column, but that the attributes in each column can be derived one from another in the order from above downward. Hence we may formulate the following laws or axioms for the categories:

Categorical Axioms

I. The unit categories are derived from unity.

II. The extension categories are derived from extension.

III. The speed categories are derived from speed.

IV. The persistence categories are derived from persistence.

V. The consciousness categories are derived from consciousness.

VI. One absolute cannot be derived from another of a different category.

VII. One relative cannot be derived from another of a different category.

VIII. One quantity cannot be derived from another of a different category.

IX. One property cannot be derived from another of a different category.

X. One quality cannot be derived from another of a different category.

We have already formulated the laws or axioms of the evolution of attributes, but will repeat them here.

Evolutional Axioms

I. As kinds are multiplied by organization, attributes are correspondingly multiplied.

II. As forms are multiplied by organization, attributes are correspondingly multiplied.

III. As forces are multiplied by organization, attributes are correspondingly multiplied.

IV. As causations are multiplied by organization, attributes are correspondingly multiplied.

V. As concepts are multiplied by organization, attributes are correspondingly multiplied.

In considering categories we must properly discriminate one from another. Unity must be discriminated from extension, extension must be discriminated from speed, speed must be discriminated from persistence, and persistence must be discriminated from consciousness. In like manner the five relatives must be discriminated, the five quantities must be discriminated, the five properties must be discriminated, and the five qualities must be discriminated. So also absolutes, relatives, quantities, properties, and qualities must be discriminated. The failure to make these discriminations is the source of many logical fallacies.

To avoid these fallacies the categorical axioms are given as the foundation of all deductive reasoning.

ANTLER-POINTED ARROWS OF THE SOUTH-EASTERN INDIANS

By CHARLES C. WILLOUGHBY

In 1899 the Peabody Museum of Harvard University received as a gift from the proprietors of the Boston Museum Theater the valuable archeological and ethnological material which for many years had been preserved in the exhibition cases of the museum formerly connected with that institution. Many of these objects had previously belonged to the Charles Wilson Peale Museum (established in Philadelphia in 1785) and were collected in the eighteenth and the first part of the nineteenth century.

This material included several incomplete sets of arrows, probably obtained at an early date from some of the south-eastern tribes. Examples of these are illustrated in plate X. *a* represents one of three arrows from a set; it is 30¼ inches long; the shaft of split hickory is without grooves, is about five-sixteenths of an inch in diameter at the center, and tapers gradually toward either end. The point is of antler, lozenge-shaped in cross-section, carefully finished, and painted red, the end of the shaft being inserted in a hole in its base. The feathering consists of three split feathers of the wild turkey trimmed to abrupt points at their lower ends. The two feathers bearing white blotches are wing quills, and the one with reddish-brown marking is from the tail. The feathers are seized at either end with sinew. The colored markings on the shaftment (the riband) are in red and black.

Plate X, *b*, in every way but the point, is a duplicate of *a*, and evidently belonged to the same quiver. The point is round in cross-section, is made from the tip of an antler prong, and has

also been painted red. The base of the point is cut to form two barbs.

Plate X, *c*, belongs to a different set from the ones described. The shaft is made from a shoot of a shrub or small tree, and is feathered with three split feathers of the wild turkey, their lower ends trimmed to a tapering point. The riband is in black and red. The double-barbed point is of antler and is not painted.

Plate X, *d*, shows the best preserved of four arrows from a third set. The shaft, like that of the preceding one, is made from a shoot of a shrub with opposite leaves, probably the cornus. The feathers are of the wild turkey, split and trimmed to three-eighths of an inch in width to within one-eighth of an inch of the lower extremities. The remainder of the web is left uncut and forms a tail or trailer at the end of each feather. The riband is in red and black, and the unpainted antler point is furnished with two barbs. The principal differences to be noted between this arrow and the one last described are the riband and the trimming of the lower extremities of the feathers.

Unfortunately there is no record accompanying these arrows. We may assume, however, with a reasonable degree of certainty, that they were obtained from southern Algonquian tribes or from one of the neighboring stocks.

The hickory tree from which the shafts of plate X, *a* and *b*, are made, is found in that portion of Canada bordering Lake Erie, Lake Ontario, and St Lawrence river, in New England and the middle states, the northern and western portions of the southern states, and westward to central Kansas and Nebraska. This tree extended into the Siouan region and was used to a certain extent for bows by the Sioux and neighboring tribes.

In studying the arrows of historic primitive peoples of different parts of the world, we find that, excepting among the Indians of central and western North America and in a few other restricted localities, flint points seem to have been the exception. This may be explained in some sections by the absence of suita-

ble stone for making arrowpoints. It should be remembered, however, that only a portion of the so-called flint arrowpoints found throughout America were ever attached to arrowshafts. The majority are probably rejects; many of them were knife blades attached to short handles, others were points to projectiles thrown with the hand or by the aid of some form of spear-thrower.

There is little evidence of the use of stone arrowpoints in New England within historic times. Gosnold in 1602 found the natives supplied with "copper" points, "some very red, some of a paler color" (brass?); Waymouth three years later saw arrows headed with points made from the long shank-bone of the deer; Champlain at about the same date found them tipped with the tail of the horseshoe crab; Mourt's *Relation* refers to arrowheads of brass, eagle claws, and hartshorn; Higgeson, writing in 1629, speaks of bone and brass arrowtips; Wood also mentions brass points, and writes of the feathering of the arrows with the wing and tail feathers of the eagle.

The Indians in several places in Massachusetts and southern Maine showed Champlain turkey-feathers "with which they feathered their arrows." The excellency of New England arrows is shown by the fact of their use as an article of trade with the tribes of the St Lawrence region, where Champlain found stone arrowpoints in use. None of the above writers refers to stone-pointed arrows within New England; they seem to have fallen into disuse at an early period. There are brief references to stone-pointed arrows in the regions adjoining the northern, western, and southwestern portions of New England. Holm mentions arrowpoints of stone, bone, horn, and the teeth of large fishes or animals among the Delawares; and Kalm refers to points made from stone, from the bones of animals, and from the claws of birds and beasts among the Indians of the same region. Smith mentions stone arrowpoints among the Virginia Indians. Beverly in his *History of the Present State of Virginia* (1705)

refers to arrows of reeds or small wands fledged with turkey-feathers and headed with stone or the spurs of the wild turkey-cock. Adair, writing of the Cherokee, describes arrows pointed with "scooped" points of buckhorn, turkey-cock's spurs, and stone. Timberlake mentions points of brass, copper, bone, and the scales of a certain fish; he writes that some of the points were of triangular form, and were inserted in the split end of the shaft, which was usually made of a reed. The point was secured by wrapping the end of the shaft with sinew, and passing the cord through a perforation in the metal point (compare fig. 56). In the province of Cofachiqui, De Soto employed an Indian guide whose quiver contained arrows with reed shafts, some of them tipped with buckhorn wrought "with four corners like a diamond" (compare plate X, *a*), some with bones of fishes curiously fashioned, others with hardwood or with flint.

While stone-pointed arrows were doubtless used to a greater or less extent by all the tribes of the United States, some other material seems generally to have been preferred in certain sections, notably the east.

Besides the stone-pointed arrow the early Siouan tribes used arrows pointed with splinters of the leg-bone of the buffalo or elk ground thin and smooth. An old example of this type in the Peabody Museum has the shaft grooves and proportionally long shaftment characteristic of the Siouan arrows. The thin bone point is of the same general form as the iron points adopted later which were obtained principally from white traders.

There is ample archeological evidence that antler-tipped arrows of the type illustrated in *b*, *c*, and *d*, plate X, were used from Maine to Arkansas. The Peabody Museum in Cambridge and the American Museum of Natural History in New York have collections of these points in all stages of formation. They are all from the Algonquian area or the region immediately bordering it. The unfinished point shown in fig. 54, *a*, is from the shell-heaps of Maine. There are two other specimens from the same locality in the Peabody Museum collection.

Fig. 54, *d* and *e*, were taken with several others from a grave on Staten island by Mr George H. Pepper of the American Museum. Some of the points were found embedded in the bones of the skeleton.

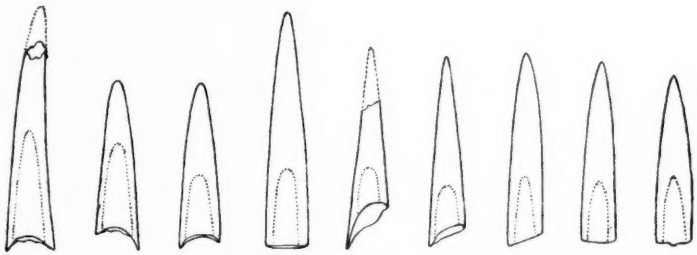


FIG. 54—Antler arrowpoints (one-half nat. size), *a*, Maine; *b*, *c*, Ohio; *d*, *e*, New York; f, Kentucky; *g*, *h*, *i*, Arkansas. *a*, *b*, *c*, *g*, *h*, *i*, Peabody Museum; *d*, *e*, f, American Museum of Natural History.

Fig. 54, *b* and *c*, are from the ash-pits of the village site and cemetery at Madisonville, Ohio. They were obtained by the score in all stages of manufacture, from the antler branch with the shallow, encircling groove marking the first step in the process of manufacture to the finished and carefully polished point.

Fig. 54, *f*, is from the village site and burial place near May's Lick, Kentucky, and was obtained with many others by Mr Harlan I. Smith who conducted the exploration for the American Museum. Specimens *g*, *h*, and *i* are from the mounds and village sites in Poinsett and Cass counties, Arkansas. A few of the points shown in outline are finished or nearly so. The others in the same figure are evidently rejects, discarded on account of some imperfection.

In the manufacture of these points the antler prong was encircled by a groove cut to the required depth at a proper distance from the point (fig. 55, *a*); the point was then broken off, drilled, and afterward cut and scraped to the required form, then ground and polished (fig. 55, *b–e*). The base of the point was cut either straight across or in such manner as to form one or two barbs.

Accompanying the antler-pointed arrows illustrated in plate X and doubtless obtained from the same general region, were eleven from a fourth set having triangular copper points smaller but of the same type as those of copper and brass occasionally found in the graves and village sites in New England. The copper point is perforated near the center, and is inserted for about half its length in a slot cut in the end of the arrowshaft to which it is bound by sinew, the cord passing through the perforation in the metal point (fig. 56), a method followed by the southern Indians and also by the Indians of New England.[1] The well-made shaft of split hickory is without grooves. The nock is expanding and the notch is deeply cut. The feathering consists of three differently colored split feathers of the wild turkey trimmed to a uniform width of a little more than three-eighths of an inch. These are seized at either end with sinew, the white-spotted feather taken from the turkey's wing being stained yellow. The riband

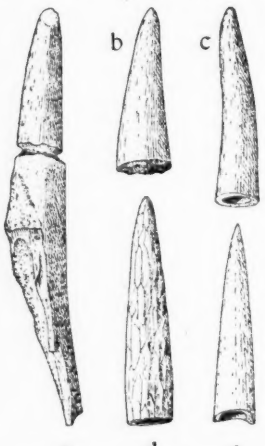
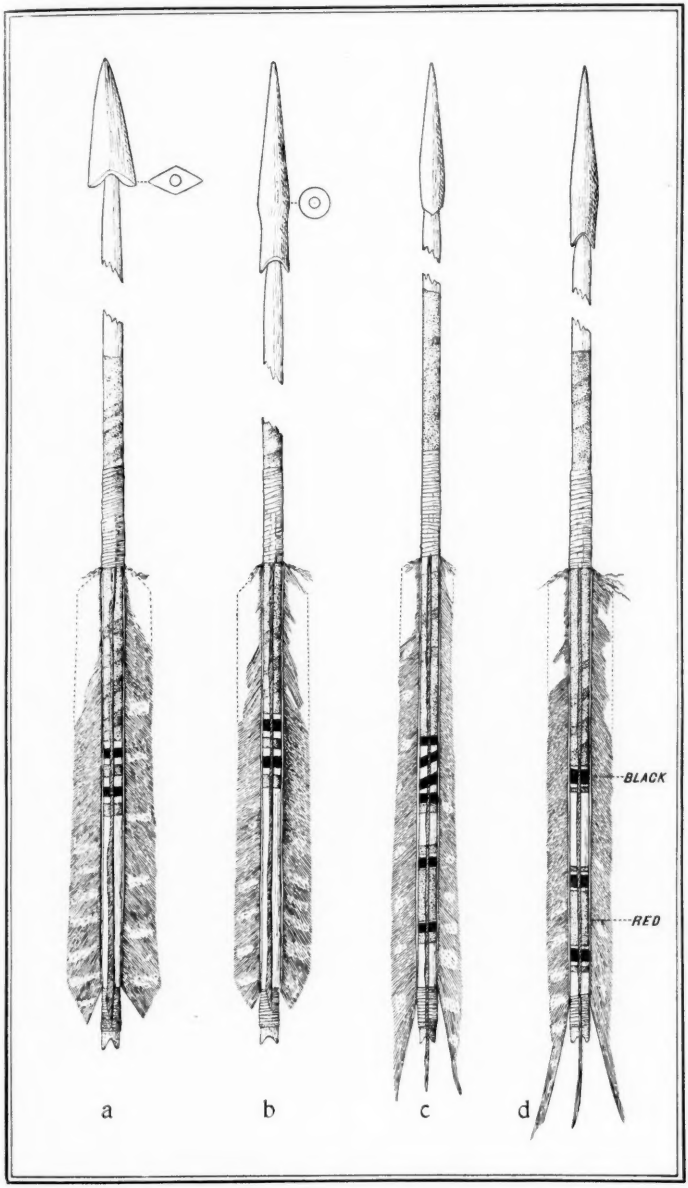


FIG. 55—Antler arrowpoints, illustrating process of manufacture. From village site and cemetery, Madisonville, Ohio. (Peabody Museum; one-half natural size.)

FIG. 56—Copper-pointed arrow of the southeastern Indians (full size).

[1] The perforated, triangular brass arrowpoints found with the famous "Skeleton in Armor" Indian at Fall River in 1831 were attached to the shafts by a cord wrapped around the end of the shaft and passed through the perforation in the point. The upper portion of the shafts and the cord wrapping were preserved by contact with the metal. The "armor" and other metallic contents of this grave are fully described and illustrated in *Mémoires de la Société des Antiquaires du Nord*, 1840–1844, pp. 104–110 and pl. v. They are preserved in the Ethnographiske Museum at Copenhagen (with the exception of two of the brass tubes which are in the Peabody Museum at Cambridge), only the skeleton having been destroyed by fire at Fall River.



ANTLER-POINTED ARROWS OF THE SOUTHEASTERN INDIANS (TWO-FIFTHS NATURAL SIZE)

consists of two narrow encircling bands of red placed almost together near the center of the shaftment, and two additional bands of red at either end of the sinew wrapping which holds the feathers farthest from the nock. The sinew wrapping below the copper point is also painted red.

In studying the arrows of the tribes inhabiting the region east of the Mississippi it should be remembered that the full-sized bow of the Iroquoian tribes and the Atlantic coast Algonquians measured approximately five and one-half to six feet, with arrows of proportional length. The hickory self bow taken from an Indian at Sudbury, Massachusetts, in 1664, and now in the Peabody Museum, measures five feet six inches. The unique Abnaki compound bow belonging to Big Thunder, a Penobscot Indian, measures about five feet seven inches in length. The various accounts by early writers and the drawings by John White (1585) and other early artists, of the southern coast tribes, show that the shorter bow of the Algonquians of the interior and other tribes of the west was not commonly used by the coast Indians. Judging by the length of the antler- and copper-pointed arrows herein illustrated, they were used with bows of medium length and probably belonged to interior southeastern tribes.

THE LESSER NEW-FIRE CEREMONY AT WALPI

By J. WALTER FEWKES

Introduction

Fire is or was regarded by the Hopi Indians of northeastern Arizona as a living being, its cultus consisting primarily of rites for germination, and, secondarily, for rain-making. When "new fire" is ceremonially kindled, this act and the accompanying rites are "prayers" to the Fire-gods, or, what is practically the same thing, to the personations of great magic powers, male and female, which generate or "create" living beings.

The Greater New-fire festival[1] occurs at Walpi in November and is celebrated by all male adults of the pueblos on the East Mesa of Tusayan. The "gods" worshiped at that time are (1) the male Germ-god, *Masauû*, God of Fire and ruler of the abode of the dead; and (2) his female complement, the Germ-mother, called *Alósaka*-woman or *Talatumsi*, and *Tuwapoñtumsi* or Earth-woman.[2]

The festival is celebrated at Walpi[3] in an abbreviated and an elaborate form, and is the most complicated ceremony performed on the East Mesa.

There is another Fire festival, of much less complication and possibly of different geographical origin, performed in the two East

[1] "The New-fire Ceremony at Walpi," *American Anthropologist*, o. s., 1898.

[2] Talatumsi is so called because her idol is worshiped at sunrise (*tala*); *Alósaka*-woman because at Awátobi, from which pueblo her cult was derived, her complement, the Germ-god, was called by this name. The Earth-woman (*Tuwapoñtumsi*) is represented by a log of petrified wood, an archaic personation of Mother Earth. (For an illustration see "The New-fire Ceremony at Walpi," *op. cit.*)

[3] It was in part derived from Awátobi, a Hopi pueblo destroyed two hundred years ago, and may justly be supposed to contain many ceremonial survivals of that ill-fated village.

NATIVE PICTURES OF SUMAIKOLI, KAWIKOLI, AND YAYA PRIESTS

Mesa pueblos of Hano and Walpi. This festival is controlled by a single priesthood, still represented in New Mexican pueblos. The Hopi call it *Sumaikoli;* in this article it is designated the Lesser Fire ceremony. As the *Sumaikoli* is much simpler than the *Wüwütcimti*, or Greater New-fire ceremony, its meaning is less difficult to discover, the essentials in it not being obscured by secondary accretions. This meaning is found to be identical with that of the Greater New-fire ceremony, that is, a "prayer" to *Kokyan-wüqti*,[1] with added prayers to the Sun, Moon, *Masauû*, and the cardinal points.

The *Sumaikoli* is a special ceremony of a fraternity of priests called the *Yaya*, and occurs in the months of July and March. It has no connection with the Greater New-fire festival in November, which is controlled by four other fraternities.[2] Two of the East Mesa pueblos celebrate this lesser festival, and as one of these, Hano, is a Tanoan village, the author believes that it was introduced from New Mexico by Tanoan clans—a conclusion supported by the fact that it is not observed at Oraibi, where the influence of colonists of this kinship is less marked than at Walpi. While the fact that it is celebrated in Hano is enough to betray its Tanoan derivation, there are other arguments which point to the same origin. Its name is not Hopi, and its chief, Simotci, belongs to a clan generally identified as of eastern, possibly of Tanoan, origin.

The summer or July *Sumaikoli* at Hano was first witnessed by the author in 1891; he has never seen the spring presentation of this festival at that pueblo, for the old chief, Kalacai, died about 1892, and his successor did not give the performance in 1900, when the author was living in the neighborhood. The

[1] Spider-woman, an animal personation of the magic power of Earth; called, in the Greater New Fire, *Alósaka*-woman or *Talatumsi*, and *Tuwapoñtumsi*. Also known as Old Woman, *Müyiñwû*-woman, and by numerous other names.

[2] Almost all the great Hopi festivals have a major and a minor celebration of their mysteries, occurring six months apart, but *Sumaikoli* is not a minor celebration of the *Wüwütcimti*.

chamber in which the masks and other paraphernalia are kept has often been visited in recent years and the objects have frequently been inspected by the author and his friends.

So far as known, the only published pictures of the public masked *Sumaikoli* are those of Dellenbaugh,[1] who, however, fails to add any new facts that would lead to an interpretation of its meaning. The Hano *Sumaikoli* has already been described,[2] but up to the present time nothing has been published on the Walpi variant. The present account is based on notes made in March, 1900, while the author was engaged in ethnological work in Arizona for the Bureau of American Ethnology.

The Yaya Priests

The fraternity of priests known as the *Yaya* is an ancient one, represented by distinct organizations in both Hano and Walpi. From existing legends it appears that this fraternity had much greater power in ancient than in modern times, and was formerly more conspicuous in the ritual.[3] The living members claim for their predecessors most extraordinary power over fire and recount incredible stories of their magic. These latter are practically believed by the older members, who say that they have witnessed the events described. They assert that members of the priesthood once swallowed fire without harm; were able to leap into a bonfire uninjured, and could carry bundles of fagots about the plaza until their bodies were covered with burns and their hair consumed, without suffering either pain or injury; while their magic

[1] *North Americans of Yesterday*, New York, 1901.

[2] *Journ. Amer. Eth. and Arch.*, Vol. II. The row of objects called "shields" in this description are not war-shields, but masks or "face-shields." They are called *sumaikoli*, and the personators who wear them bear the same name. The ceremony is likewise called *Sumaikoli*, but the priests who control it are known as *Yaya*. The signification of the terms *Yaya* and *Sumaikoli* is unknown to the writer.

[3] The accompanying figures (plate XI) show the costume and paraphernalia of a *Yaya* priest. Attention is called to the peculiar framework rattles which these priests carry in their left hands. The original drawings, here reproduced, were made by a Hopi Indian.

power over fire is said to have been so great that they could cure its ill effects on the human body.

Numerous other stories of the marvelous magic of the early priests are current among their present representatives. The ancient *Yaya* were accustomed, it is said, to seat themselves on the edge of the mesa and throw themselves, without harm, headlong to the plain several hundred feet below. A member of the old priesthood, they say, performed the following deed by his magic power: The "Giant's Chair" is a large butte visible from the Walpi plaza, although over thirty miles distant. One of the *Yaya*, in presence of many spectators, took his stand in the plaza, holding in one hand a bowl of white pigment and in the other a fragment of cloth; he dipped the cloth in the pigment, held it up before the witnesses, made a pass in the air as if rubbing the distant butte, and his power was so great that the mountain turned white. Shortly afterward the same man made another pass with his hand, and the Giant's Chair resumed its ordinary dark or black color. Many other marvelous stories are told of the magic powers of the ancient Fire-priests, but those cited will serve to show their general nature.

At the present time, although much less important than formerly, the *Yaya* priests are still believed to have great shamanistic power in curing disease. Their method of treatment is quite prevalent in primitive medicine, based on reasoning by analogy, so constant in savage philosophy. For example, skin eruptions present analogies to the effect of fire; they itch or burn, hence they can be cured by fire or its products—heat, ashes, and the like. By application of charcoal or ashes the *Yaya* claim to cure burns, scalds, or skin eruptions of various kinds. Heated rocks tied to a broken leg are supposed to heal the fracture.[1] By their magic power over fire and its products the *Yaya* counteract the

[1] The author witnessed a *Yaya* shaman, Nūvawinû, make use of ashes in the treatment of a burn on a woman's neck. He filled his mouth with charcoal and ashes, chewed them, and squirted the mixture, Chinese fashion, on the afflicted part.

magic power of those who cause these disorders, for disease to primitive man is the product of sorcery or the malevolent magic of an enemy.

General Remarks on the Sumaikoli

It is customary for the priests to indicate the existence of secret rites by objects placed near the entrance of the room in which they are performed. The *Yaya* priests use for this purpose two small feruled sticks and a spherical gourd attached to the end of a rod inserted in the straw matting which ordinarily serves as a cover for the kiva entrance. These objects were placed on the *Alkiva* during the *Sumaikoli* ceremony in 1900.

The rites witnessed by the author lasted one day, having been opened early in the morning by the kindling of a new fire. Shortly after noon this fire was carried by couriers to four shrines of the Fire-god. The interval between these two events was occupied in the manufacture of prayer-sticks and in their consecration by prayers, songs, smoking, and invocation to a personation of Mother Earth called *Kokyan-wüqti*, or Spider-woman.

The following events occurred at Walpi on the single day of the *Sumaikoli* festival:

1. Fire kindled by friction.
2. Manufacture of prayer-offerings (later enumerated.)
3. Consecration of the prayer-offerings; prayers.[1]
   - *a*. Ceremonial smoke.
   - *b*. Verbal prayers.
   - *c*. Songs.
   - *d*. Invocation to Spider-woman.
   - *e*. Verbal prayers.
   - *f*. Ceremonial smoke.
4. Couriers carry fire and prayer emblems to four shrines.

A minute description of these events cannot here be given, although their details were carefully studied and recorded[2]; but

[1] The word "prayer" is here used in its broadest sense, including all the means by which the worshiper makes known his desires.

[2] This article is preliminary to a complete and more elaborately illustrated description of the rites, especially those before the altar when the songs are sung.

SUMAIKOLI ALTAR AT WALPI

a brief notice of their general character will be presented, with suggestions as to their significance.

Significance of the Sumaikoli Secret Rites

A secret ceremony may be considered from the following sides:

1. From that of the paraphernalia used — a description of the ceremonial objects (*wimi*), their installation on or about an altar, and their symbolism.

2. Means by which the magic power of the paraphernalia is quickened, and those by which that action is directed to obtain desired results. These means are commonly called prayers.

3. Prayer-sticks and, in the case of *Sumaikoli*, prayer-fire by which the prayers are carried to the shrines of the gods.

1.— *The Sumaikoli Wimi Installed in an Altar*

Every Hopi religious fraternity has a collection of fetishes and other objects which it makes use of to bring about certain results. The possession and knowledge of how to use these objects, or *wimi* as they are called, gives the name *wimkya* to a Hopi priesthood. The *wimi* are practically all the paraphernalia of worship—idols, painted slats, symbols, masks, and other objective material used in the ceremonies. An altar is their prescribed installation, and may be simple or complicated according to the number and character of the objects. The *Sumaikoli* altar (plate XII) consists of a row of disks, or shield-like bodies which, from the fact that they are sometimes worn on the head and have faces depicted on them, will be called face-shields. These disks are set side by side on the floor of the kiva with their edges touching; they are painted with the same symbols, although their colors vary considerably. Since there are six of these face-shields or masks, with colors corresponding to those of the six cardinal world-directions of the Hopi, they symbolize those points, viz., north, west, south, east, above, and below; or, beginning at the

right, yellow, green, red, white, black, and black (called also *kawikoli*).

Two objects, called *tiponis*, one of which belongs to the chief, Simotci, are placed on the floor before the row of face-shields. They are badges of chiefs and are called "mothers," for they are the most precious of all altar *wimi*. From one of these, as is customary in all altars, a line of meal, upon which is laid a string with attached feathers, is drawn along the floor toward the ladder which forms the exit from the room. This line symbolizes a trail along which the magic power of the *wimi* is supposed to pass.

One of the most important objects[1] on the floor before this line of face-shields, and by the side of the *tiponis*, is composed of many black sticks tied together like a fascis and ornamented with attached feathers. This fetish is called Spider-woman and represents one of the dual supernatural beings worshiped in the *Sumaikoli*.

2.—*Means of Quickening and Directing the Magic Power of the Sumaikoli Wimi*

Under this heading is included what is ordinarily covered by the expression "making medicine." The rites which occur around a medicine-bowl or before an altar are supposed to quicken the magic power of the medicine or *wimi*. At the same time these rites are prayers and serve to make known the wishes of the participants. Several kinds of prayers are used in the *Sumaikoli*:

A. Kindling the new fire. The priests want germs of life to develop. The priest kindles fire, or makes life, thus directing the God of Fire or Life to do likewise.

B. Verbal prayer. The priest makes known by words how he wishes the magic powers to act.

[1] This object was not unwrapped by the priests while the author was present, but, judging from the contents of similar "baskets" in the *Lalakonti* which the writer was permitted to inspect in 1891, it probably contains many seeds, pigments of various kinds, and possibly shells and other articles.

C. Song prayers. Rythmic vocal directions to the gods indicating the ideas of the priest.

D. Pantomimic or symbolic prayer, otherwise designated as "prayer by signatures." Ceremonial smoking is a good illustration of this kind of prayer. A cloud of tobacco smoke resembles a rain-cloud;[1] a rain-cloud brings rain; therefore, by analogy, making smoke brings rain.[2]

a. Kindling the new fire by friction.—The new fire is kindled in the *Sumaikoli* ceremony in substantially the same way as in the November New-fire ceremony, elsewhere described; but attendant rites in the former are less complicated than in the latter, where only one fraternity of priests participate.[3] Two sticks were used in kindling the fire, one of which we may call the twirler, the other the notched firestick. The former is regarded as male, the latter female.[4] In making the fire the notched firestick is placed on the floor and the twirler is inserted in a small depression near its edge. The twirler, which is held between the open hands, is rapidly rotated; pollen (the male prayer symbol) is added, and finally, through friction, a grain of ignited dust falls from the cavity, through a notch, on shredded cedar-bark placed on the floor beneath the notched firestick; this is fanned into flame by means of which the fuel in the fireplace is ignited.

b. Verbal prayer.—This form of prayer is a direct appeal to the gods, either by means of comprehensible language or through

[1] In seasons of great drought the Navaho are said to kindle great forests or to make other fires in order to create a great smoke which "causes rain." Here is involved the same idea as in smoking with the mouth, but carried out on a much larger scale.

[2] This fallacy is a very natural one when the true character of smoke and clouds is unknown. Superficially they resemble each other to the primitive mind, hence they are identical and both have the same powers.

[3] The author arrived at the kiva too late to witness the *Yaya* kindle their new fire, but he saw the twirler and notched firestick on the floor and the fire burning in the fireplace, and was told that the fire had just been made by friction. There was every evidence that the fire had been made only a few minutes before he entered the room, which statements of the priests confirmed.

[4] The designation of the twirler as male and the notched firestick as female is common among primitive men. The latter is sometimes carved in the form of a woman or bears a female symbol.

mere meaningless sounds. In the *Sumaikoli* prayers there is one good example of the latter. At the culmination of the rites, while songs are being sung, the chief, Simotci, kneels on the floor by the side of the fetish, puts his mouth to a hole in the floor (which is said to communicate with the Underworld home of the Earth Mother), and yells several times, "*Ya-a-he-he-he!*" These meaningless syllables are invocations to the Spider-woman for the germination of seeds and other life.

3.—Means by which Sumaikoli Prayers are Conveyed to the Gods

In Hopi methods of worship an object or symbol bears the prayers to the gods. These objects have magic power, are quickened and directed as already mentioned, and are carried to shrines or (symbolic) dwelling places of gods, where they are supposed to exert the magic powers imparted to them. They may be said to "speak" to the gods. The two types of these objects in the *Sumaikoli* ceremony are prayer-sticks and prayer-fire, both of which convey the magic power of the *wimi* to the shrines of the gods for whom they are intended. An enumeration of the gods for whom they are made and to whom they are sent reveals the object of the ceremony. Prayer-sticks bearing the names of the following were noted: 1, Sun; 2, Moon; 3, *Masauû;* 4, Unknown; 5, Cardinal points. The first four were the same as the prayer-sticks of these gods made in other rites; the last were twigs, eight in number, to which were attached stringed feathers. The prayer-sticks and the prayer-fire were distributed by four couriers, who carried also symbolic food consisting of ground *pîki* (paper bread), *pîgume* (dried pudding), and fragments of peaches. Each courier was naked and carried a cedar-bark torch which was ignited at the kiva fireplace. With these lighted torches in one hand, the couriers shouted as they ran through the pueblo, and rushed down the trail to the *Masauû* shrine[1] situated in the foot-

[1] Called the "great *Masauû* shrine." This "house" of the Fire-god is figured in *Jour. Amer. Eth. and Arch.*, Vol. II. The sticks and twigs upon it are deposited by returning wood-gatherers as prayers to *Masauû*.

hills north of the pueblo. When they had arrived there they placed the prayer-sticks in the shrine and hastily gathered a pile of such twigs and other bits of wood as were available. This pile they ignited, then immediately left the place, making a quarter circuit of the mesa to a second shrine, situated west of the village, where they made a second fire, and so on to the south and east shrines, at each point kindling and leaving a small fire and feather and other offerings to the Fire-god and other gods. They then returned to the kiva on the mesa. In elaborate performances of the *Sumaikoli*, distribution of the fire and other prayer-bearers is more public, and it is said that the prayer-fire is carried to the shrines by men wearing face-shields, but this the author has never seen.

There is this essential difference in the distribution of the offerings in the *Sumaikoli* and the *Wüwütcimti*. In the latter, prayer-fire is carried to the four kivas and not to the shrines of *Masauû*, for a personation of *Masauû* sits in the kiva while the fire is kindled, and prayers are made directly to him. Two societies of priests carry offerings to the Germ-mother [1] immediately after the new fire is kindled in the November festival.

On the evening following the events above described, there were songs and possibly ceremonies in the kiva which escaped the author's attention.[2]

Public Exhibition of Sumaikoli

It will be noted that there is no mention of a public exhibition of masked men in the *Sumaikoli* of Hano pueblo [3] or in that of

[1] As a personation of the Fire-god sits in the kiva while the fire is being kindled, there is no need to carry prayer-fire to his shrines in the Greater New Fire; but there is no personation of the Germ-mother in the room at that time, consequently the priests visit her shrines. In the *Sumaikoli* there is no personation of *Masauû* in the room where fire is kindled, hence prayer-fire is borne to his shrines; but as the Germ-mother (*Kokyan-wüqti*) is represented by a fetish, there is no visit to her shrine in the *Sumaikoli*.

[2] The author was unable, from exhaustion, to witness this part of the *Sumaikoli*, as constant vigils in the kivas in March taxed his strength to the utmost.

[3] See *Journ. Amer. Eth. and Arch.*, Vol. II.

Walpi here described. All the rites occur in the kiva, and the public sees nothing except the fire couriers rushing through the pueblo and down the mesa side to the shrines as above mentioned. On some occasions, however, the face-shields or masks which are so conspicuous on the altar are worn in public. Various masked men, representing *katcinas*, likewise participate in these performances. The author has no photograph of this event, but has introduced a drawing (plate XI) representing a *Sumaikoli* and a *Yaya* priest as they appear at that time,[1] and a *Kawikoli* with another priest. Mr Dellenbaugh figures other masked men, one of which he calls "*Hobobo*." From the fact that the masks are sometimes worn in public exhibitions of the *Sumaikoli*, we learn that the festival becomes at times more elaborate and are led to the conclusion that the couriers who bear the fire sometimes wear the face-shields so prominent on the altar (plate XII).

It is said that incredible feats with fire, which legends declare were formerly performed during the *Sumaikoli* ceremony, took place in public at this stage of the festivities. It is claimed that a Hopi fire-dance was once performed which rivaled that of other tribes, and it is possible that these public exhibitions somewhat resembled the fire-dance of the Navaho; but as the author has never seen either, he is unable to express an opinion on this point, nor is he able to make any comparison with the variants of the *Sumaikoli* which survive among Pueblos not of Hopi stocks. Survivals no doubt exist in several pueblos, but, so far as the author knows, nothing definite has been recorded concerning their character.

Conclusions

1. The *Sumaikoli* ceremony is a fire festival of the *Yaya*, or Fire-priests, in which fire is ceremonially kindled with secret rite. and masked beings sometimes appear in public.

[1] The drawing from which this was copied was made by a Hopi familiar with the public exhibition of the *Sumaikoli*. Although the face-shields bear representations of eyes, the *Sumaikoli* are said to be blind.

2. The festival was introduced into the ritual of Walpi from Zuñi, the Rio Grande pueblos, or directly from Hano where it is still observed.

3. Its purpose is primarily a prayer for the germination of life, to which are added those for rain and other blessings.

4. The special gods "worshiped" are the Germ-father and the Germ-mother.

5. The Germ-father, here called *Masauû*, the Fire-god, is communicated with by means of prayer-sticks placed in his shrines or prayer-fires kindled in the vicinity of the same.

6. The Germ-mother, called in this ceremony by the name of her animal personation, *Kokyan-wüqti* (Spider-woman), is communicated with by invocations consisting of archaic monosyllables shouted by the chief.

7. The *Sumaikoli* are ancients of the *Yaya* priests, and their personators wear face-shields bearing traditional symbols when they dramatize the ancient ceremony. A face-shield or mask has magic power, and its presence on the altar is a symbolic or mute suggestion of the elaborate ceremony of the ancients.

8. A comparison of the *Sumaikoli* and *Wüwütcimti* ceremonies shows that the Germ-mother has different names among the Hopi. In the Greater New-fire festival we find her called *Talatumsi* or *Alósaka-wüqti*, and *Tuwapoñtumsi;* in the Lesser, *Kokyan-wüqti*. These and several other names applied to the same personage betray the composite character of Hopi mythology. By the same theory the Germ-god, who is called *Masauû*, the Fire-god, in the New-fire rites, is elsewhere known as *Eototo*,[1] and appears in other rites also as *Müyiñwû* and *Alósaka*. The

[1] The mask of *Eototo* is white, that of *Masauû* black; but the symbolism and paraphernalia of the two are identical. There are several reasons which lead the author to suspect that *Eototo* is the old Germ-god of the ancient pueblo of Sikyatki: (1) He is personated by the chief of the *Kokop* clan which once lived at that pueblo; (2) There is said to have been an *Eototo* clan at Sumaikoli; (3) The personator of *Eototo* in the *Soyáluña* utters Jemez or Keresan words to the effigy of the Great Serpent, and legends agree that the people of Sikyatki came from Jemez.

author does not believe that these several designations denote different gods, but regards them as attributal or special names of one great magic male power, the Sky-god, whose appellations vary with different clans. *Masauû*, *Müyiñwû*, *Eototo*, and *Alósaka* are different names for the same god—the Sky-god, whose house is the Underworld and whose shield or mask is seen in the sun's disk.

It has thus happened that the dualism of sex in nature has been early recognized and exalted into a great genitor and genitrix—the former, magic power of sky, the latter of earth. These two powers, according to the philosophy of primitive man, have always existed, and man, animals, plants, and lesser gods have been born from these two—not created, but born. An artificer or creator is unknown to lower races in their primitive status. Cosmogony is not a proper term to apply to natal legends of a race who have no idea of a cosmos, and so-called creation myths are simply stories of how races of men and animals, themselves often mythic, were born from Earth and Sky. The names of these two parents may vary greatly and their powers be ascribed to animal personations,—a giant bird or snake or a combination of the two may in course of time be spoken of as the Sky-god, and a spider or a mole as the Earth-goddess; the sun (shield or mask of the former) may commonly be regarded as the Sky-god. All may be elevated into "creators" by students who seek an artificer of nature as a whole among the myths of lower races. There is every probability, however, that primitive man, if he ever thought of the question, universally believed that earth, sea, and sky always existed, and that in his first essays to discover causes he limited himself to the question how the first animals and man were born. Many races recount how their ancestors were born from Mother Earth, and claim that their father was a Sky-god or some animal personation of the same.

It is known that the Hopi people were formed by the union of different clans which from time to time have drifted together,

and that prior to consolidation each group of clans had developed its own pantheon to the members of which it had given its own names. These names survive in some instances, but probably in others they have been lost. While they represent in a general way the same conception, they have not exactly the same significance—Zeus and Jupiter are in a general way the same god, yet not identical, although many generations of scholars confounded them. The gods of each Hopi clan differ slightly, for the past environments of these clans have not been alike. In the amalgamation of clans into a tribal people, differences of language have been merged into a common language and clan conceptions of gods have followed the same laws of unification.

The present Hopi idea of a Sky-god is a more or less composite conception—a generalization of magic powers of meteoric phenomena, each of which was once regarded as a separate god with a special name. Lightning, wind, rain, germination, sun, were all once given separate magic powers or were gods. Amalgamation of clans led to generalization in which the Sky-gods were all merged into one, and meteoric phenomena became attributes or "servants" of one Sky-god. While much can be said in support of a belief that a conception of a Sky-god, or recognition of the magic power of the firmament as a whole, was the primitive one from which attributal magic powers, as those over lightning, rain, and fire, have been differentiated, the author believes that the conception of a Sky-god so far as it is monotheistic is due to integration, resulting from union of clans, each of which emphasized into a god some special phenomenon of the sky.

The keynote of primitive religion is sympathetic magic. "Man," writes Tylor, one of the greatest ethnologists of our generation, "as yet in a low intellectual condition, having come to associate in thought those things which he found by experience to be connected in fact, proceeded erroneously to invert this action, and to conclude that association in thought must involve similar connection in reality. He thus attempted to discover, to

foretell, and to cause events by means of processes which we can now see to have only an ideal significance. By a vast mass of evidence from savage, barbaric, and civilized life, magic arts which have resulted from thus mistaking an ideal for a real connection, may be clearly traced from the lower culture which they are of, to the higher culture which they are in. . . . Magical arts in which the connection is that of mere analogy or symbolism are endlessly numerous throughout the course of civilization." The primitive mind associates fire with life, and comes to believe that this association of ideas exists in reality. By the symbolic act of kindling new fire, the Hopi priest believes that he can cause the gods to make corn germinate.

Description of the Plates

Plate XI. The two upper figures represent a *Sumaikoli* preceded by a *Yaya* priest. The *Sumaikoli* wears a face-shield more like that of Hano than of Walpi, but it differs from both in several particulars. The curved bodies, one on each side of the head, represent horns; the apex of the head ornament has feathers and a crook with a symbolic ear of corn. The face bears a rain-cloud symbol and an embroidered sash is tied to the back of the head. He wears a kilt decorated with triangular rain-cloud symbols, and a buckskin shirt over which is hung another buckskin garment, painted red in the original. Along the side of each leg is a row of conical shells cut from a conus and called *mosilili*. A fox-skin hangs from the belt behind, and the anklets are of red horse-hair.

The *Yaya* carries in his right hand a curious rattle made of a framework sliding on a handle. This is somewhat better shown in the figure in the lower right-hand corner of the plate.

The remaining figure, *Kawikoli*, wears a spherical helmet like that of *Masauú*, with two white marks on each cheek; on each side of the head are bunches of *nakwakwocis* or feathered strings representing prayers. There is a mountain-lion's skin over his shoulders, and he bears an ignited cedar-bark torch in each hand.

The coloring of the original drawings is lost in the reproductions, which are also somewhat reduced.

PLATE XII. This illustration shows the row of six face-shields used for an altar in the Walpi *Sumaikoli*. The facial areas, beginning at the right, are colored yellow, green, red, white, black, and black.

Two *tiponis* stand before the green *Sumaikoli*, and from one of these, diagonally on the floor, extends the meal path on which is represented the feathered string. The faces of black sticks representing *Kokyan-wüqti* rest on the floor before the red face-shield. The two other objects are a tray of prayer-meal and an aspergill.

AN ESKIMO BRAIN

By ALEŠ HRDLIČKA

The brain in question[1] is that of Kishu (or Kissuk), an adult male Eskimo of about forty-five years of age, who died of acute general tuberculosis.[2] Kishu was a chief of his tribe; he measured 1.64 m. in height, weighed about 170 lbs., was muscular, and in every respect normally developed. He died at Bellevue Hospital within less than five months after the inception of his disease. Plate XIII shows him (together with his son) as he appeared on admission to the hospital.

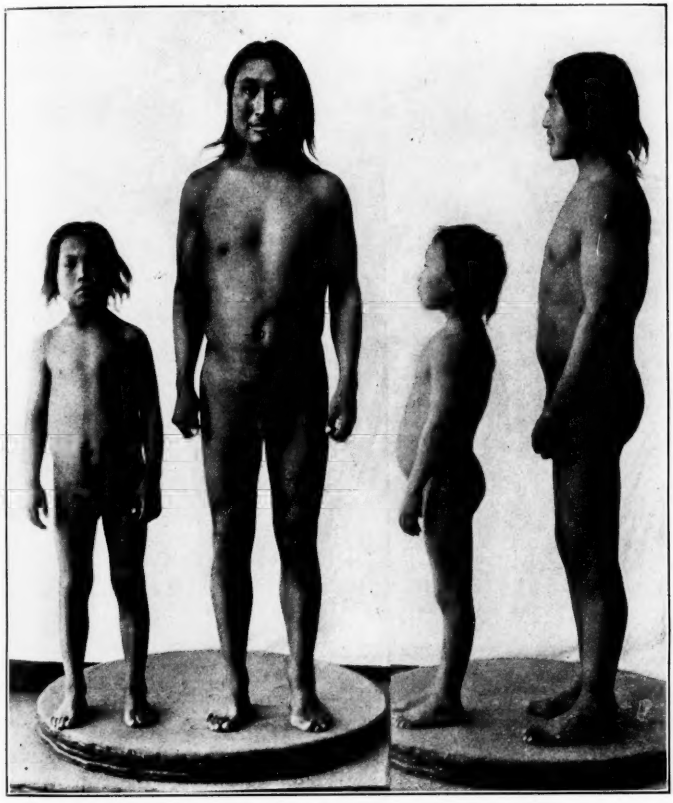
The autopsy was performed in my presence by Dr Harlow Brooks. I am indebted to Dr Brooks for notes concerning the general condition of the brain and its membranes, and to the authorities of Bellevue hospital and the American Museum of Natural History for the privilege of examining the specimen. Before the skull was opened, I obtained the following measurements of the head:

Diam. antero-post. max.....19.8 cm.
Diam. lateral max.....15.1 cm.

---

[1] The specimen was examined in 1896 and reëxamined in 1901. A preliminary report on it was published by the author in the *Proceedings of the Amer. Medico-Psychological Assoc.*, 1899.

[2] Kishu was one of the six Eskimo who were brought to New York in 1896 by Lieutenant Peary, from the neighborhood of Smith sound. Of these six Eskimo, four, including Kishu, have since succumbed to acute tuberculosis; one was sent back to Smith sound, and a boy of about twelve years survives, after having recovered from incipient pulmonary tuberculosis, in the care of Mr Wallace, the former Superintendent of the American Museum of Natural History. The brains of the three other Eskimo who died, as well as an additional specimen,—the brain of an Eskimo girl from Alaska,—will be reported upon in detail by Mr Edward A. Spitzka, of Columbia College. Some measurements and observations which I have made of these brains will be included, for comparison, in this paper.



KISHU AND MENEE (PHOTOGRAPHED ON THEIR ADMISSION TO BELLEVUE HOSPITAL)

(Cephalic index 76.26.)

Height (from line joining the aud. meati to bregma) about..... 14.2 cm.
Circumference maximum of the head..... 56.8 cm.
Diam. biauricular (between the depressions over the roots of zygomæ, in front of the ear)..... 13.2 cm.
Diam. frontal minimum..... 10.4 cm.
Diam. bigonial..... 11.1 cm.
Diam. bizygomatic max..... 14.5 cm.
Height of face: chin to nasion..... 12.3 cm.
chin to interciliary line..... 14.3 cm.
chin to insertion of hair..... 20.0 cm.

These measurements agree in the main with those which I made of the other Eskimo from the same locality, thus showing that Kishu was not racially exceptional.

The scalp was found to be less than the average in thickness; this was undoubtedly due to advanced general emaciation. The skull was entirely symmetrical; the sutures mostly still pervious; skull-cap thin. No adhesion of the dura; the soft membranes normal. Several masses of Pacchionian granulations over the longitudinal sinus. No signs of tuberculosis,[1] nor any other pathological lesion, within the cranial cavity. Very small quantity of fluid. There was a pronounced pigmentation of the pia and arachnoid from the pons to over and below the calamus scriptorius.

Weight of brain, denuded of dura mater, after a few minutes' exposure for drain, 1503 grammes.[2] The specimen was laid in 20 parts 5 % formaline and 80 parts 95 % alcohol.

[1] The brain and the heart were about the only organs in which no tubercular lesions were found.

[2] Mean weight of white male brain in 154 men of mean height of 1.680 m. equals 1361.5 grams (Broca); mean weight of white male brain in 168 men of mean height of 1.679 m. equals 1357.5 grams (Manouvrier).

Examination of the Brain

(Three weeks after death)

Weight

The brain and its principal parts, denuded of the membranes, weigh, after 15 minutes' drainage, as follows:

Whole encephalon..... 1325.0 gr.
(Loss in three weeks through solution and through loss of membranes..... 178.0 gr.)
Cerebrum..... 1155.0 gr. or 87.17% of the total.
Right hemisphere..... 577.0 gr.
Left hemisphere..... 578.0 gr.
Cerebellum..... 142.0 gr. or 10.72% of the total.
Pons and bulb.....28.0 gr. or 2.1% of the total.

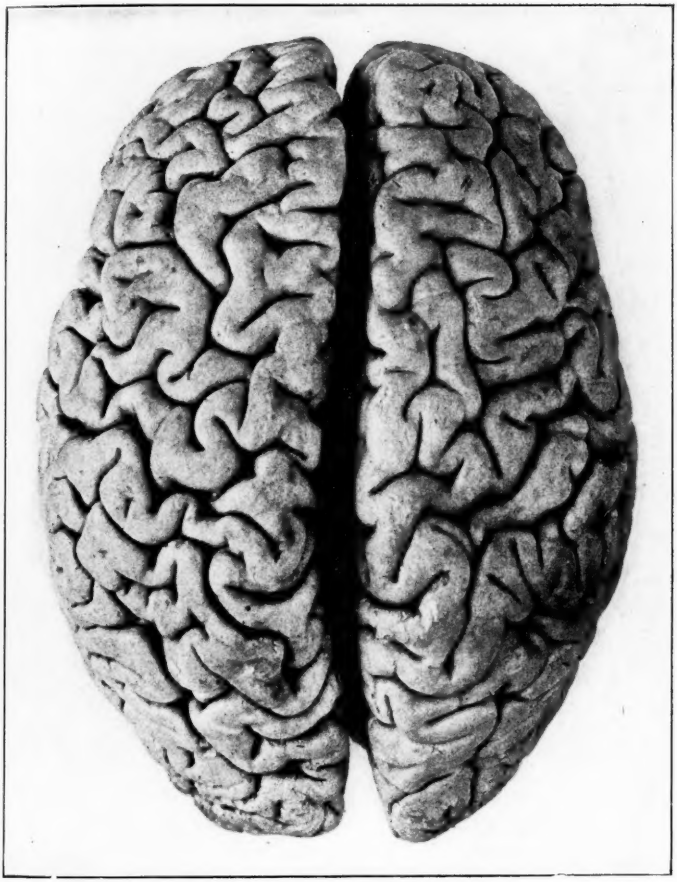
The proportions of the cerebrum and cerebellum to the whole brain are very nearly like those of whites,[1] but the relative weight of the pons and bulb is slightly greater.

GENERAL OBSERVATIONS

Cerebrum

The hemispheres in general are very well developed. The gyration is pronounced and rather more complex than that found on the brains of average whites. The principal sulci are deep. The thickness of the gray matter shows no appreciable difference from that observed in the brains of whites. The gyration of the left hemisphere is perceptibly more complex, particularly in the frontal lobes, than that of the right. A striking feature is the predominance on both hemispheres, but more especially on the right, of vertical gyration.

[1] In the white brain, the proportionate weight of the cerebellum, medulla, and pons together is to that of the whole brain in the adult as 13 to 87 (Huschke). The cerebellum is 10.7 of the total encephalon (Meynert). According to Broca, the relative weights to that of the whole encephalon are: cerebrum, 87.3%; cerebellum, 10.6%; pons and bulb, 1.91%. As to the hemisphere, in 264 men Broca found the right to be the heavier in 138 cases, the left in 105 cases; the weight was even in 21 cases.



KISHU'S CEREBRUM (DORSAL ASPECT)

The hemispheres show certain gross and many small asymmetries. The principal of the gross asymmetries are the differences in the limbic, temporo-sphenoidal, and occipital lobes. All these, as well as the minor peculiarities of the brain, will be described later.

Norma Superior.—Viewed from above, the cerebrum is distinctly hexagonal in its outline. The longest sides of the hexagon are the antero-lateral lines, upon which follow, in the order named, the anterior, the postero-lateral, and the posterior lines. The outline of the frontal lobes is quite angular.

The Norma Lateralis, or the outline of the cerebrum when looked at from the side, is obliquely quadrilateral. The antero-inferior line (base of the frontal with the antero-inferior boundary of the temporal lobes), and the postero-inferior boundary (base of temporal and occipital lobes), are nearly straight. The two superior lines, moderately convex, meet over the precuneus.

The right temporal lobe is perceptibly higher than the left.

There are a few specially prominent points on the external surface of each hemisphere: on the left such points are the supramarginal and the second temporal gyri; on the right, the supramarginal (somewhat less than on left), second temporal, and ascending parietal convolutions.

Norma Ventralis, or the outline of the base of the hemispheres, is oval, almost square anteriorly and tapering posteriorly. The basal surface of the frontal lobes slopes toward the middle and there is a marked elevation on each frontal lobe along the median fissure. These elevations are somewhat larger than those found ordinarily in the brains of whites. The olfactory nerves run along their middle. Each of the elevations comprises approximately two-sevenths of the base of each frontal lobe, and they, together with the sloping of the rest of the basal surfaces, impart to the inferior portion of the approximated frontal lobes a boat-keel-like appearance.

Norma Anterior.—The outline of the anterior lobes forms

superiorly and laterally a regular arch, while inferiorly it consists of two shallow arches (concavities of the inferior surface of the frontal lobes), which meet over the median eminence. The outer terminal points of the arches are, as usual, situated higher than the inner ones.

The anterior surface of the frontal lobes is almost vertical.

Principal Measurements of the Cerebrum[1]

Length maximum of left hemisphere	18.0 cm.
Length maximum of right hemisphere	17.9 cm.
Width maximum of cerebrum	13.6 cm.[2]

As to the parts situated at the base of the cerebrum, nothing unusual was found. The anterior perforated spaces are not appreciably larger than in whites. The optic commissure is well formed; the optic nerves are strong. Hypophysis of ordinary size and appearance. Crura cerebri, cut at the niveau of the mesial border of the hippocampal gyri, are exactly equal in size. Their cross-section measures on each side 2.8 cm. in greatest length and 1.7 cm. in greatest width.

There were no marked anomalies in the cerebral circulation. The ventricles were not opened.

External Conformation of the Hemispheres

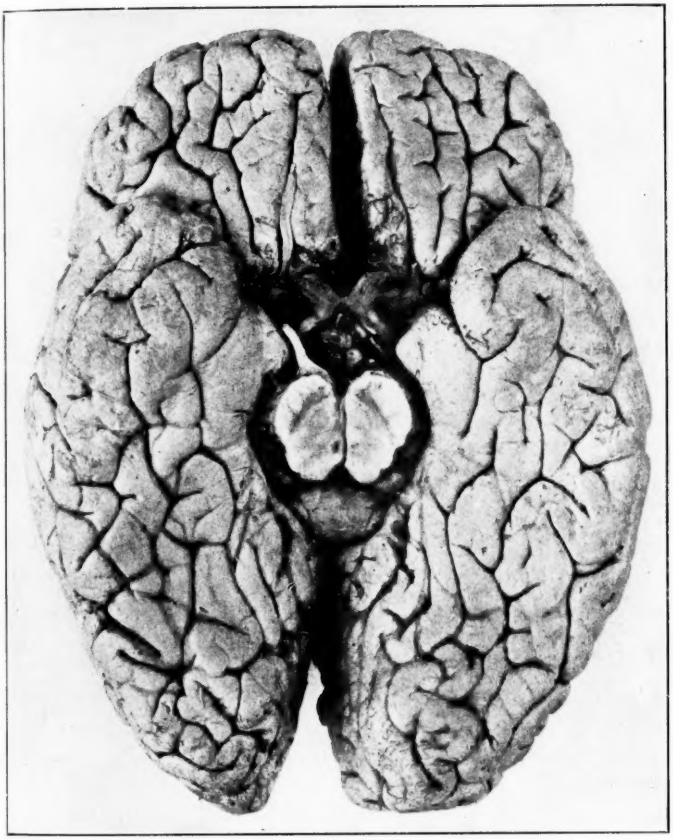
Principal Sinuosities. Fissure of Sylvius

The horizontal and ascending, or, more properly in this case, the anterior and posterior, branches of the *presylvian* begin separately, from the superior limiting sulcus of the insula on the right, and from a common fovea, connecting with that sulcus, on the left side.[3] The anterior branch is in line with, and appears like a continuation of, the anterior limiting sulcus of the insula.

[1] For additional and comparative measurements, see the end of the paper.

[2] By an oversight this measure was given in the preliminary report as 14.2 cm., which was incorrect.

[3] This, according to Cunningham, is also frequently the case in whites. In 80 hemispheres examined by that author, two separate limbs of the presylvian were found 15 times (32.6 %) on the right and 15 times (44.1 %) on the left side.



KISHU'S CEREBRUM (BASAL ASPECT)

Length of the anterior branch, l., 2.8 cm., r., 2.6 cm.
Length of the posterior branch, l., 1.2 cm., r., 2.0 cm.

On the left the posterior branch is very short, and on both sides the anterior branch is the longer (the reverse of that generally found in white people).

The anterior branch connects on the right, over a submerged but not deep gyrus, with a descending branch from the inferior frontal sulcus.

The several important opercula situated along the lower border of the hemispheres in the neighborhood of these two anterior branches of the Sylvian, differ somewhat in size and form. (See the description of the inferior frontal gyrus.)

The stem or main limb of the Sylvian runs in a nearly straight line; it measures, from the anterior branch of the presylvian to the bifurcation, 6.5 cm. on the left and 5.2 cm. on the right hemisphere.[1]

The depth of the Sylvian fissure is considerable throughout. It measures:

	Left	*Right*
At the origin (x) of the anterior branches.....	3.0 cm.	3.1 cm.
In middle between x and the precentral sulcus....	2.9 cm.	2.6 cm.
Opposite the precentral sulcus.....	2.8 cm.	2.7 cm.

The anterior branch of the presylvian measures at middle, left, 2.4 cm.; right, 2.2 cm. Of the terminal branches of the Sylvian, the superior measures, left, 2.6 cm.; right, 2.2 cm. The inferior measures, left, 1.8 cm.; right, about 0.8 cm. in depth.

The above figures show that, except at its beginning, the left Sylvian is the deeper at all points of measurement.

The main limb of the Sylvian presents the following points of interest on the two sides of the brain:

On the left, 0.5 cm. behind the posterior presylvian, there begins within the Sylvian, over a deep annectent loop, by means

[1] The left fissure is longer than the right one in the whites, and the disproportion "is evident at all points of growth" (Cunningham, *Contr. to the Surf. Anat. of the Cerebr. Hemispheres*, 1892, p. 127; also Eberstaller).

of the diagonal sulcus, a pronounced, long, composite, vertical furrow, which runs nearly parallel with the central fissure and the precentral sulci, and terminates above not far from the superior border of the hemisphere. The sulcus shows a number of medium deep and deep annectent fascicles.

On the right a similar furrow begins from the Sylvian, over a submerged loop, 0.6 cm. posteriorly to the hinder branch of the presylvian, and ascends in a quite straight line to within a few millimeters of the superior frontal sulcus. This furrow, in average as well as at maximum, is deeper than that on the left (maximum depth on the right, 1.7 cm.).

A little over 1.0 cm. posteriorly to the last mentioned furrow there begin from the Sylvian, on both sides, over a loop situated very deeply on the right and at medium depth on the left, the central fissures.

The base of the ascending frontal gyrus shows on each side a small trans-precentral, the base of the ascending parietal convolution a similar trans-postcentral sulcus. These sulci on the right side are entirely hidden in the Sylvian, but on the left side both reach to and slightly beyond the inferior border of the convolutions.

Finally, 0.5 cm. anterior to the bifurcation on the right and almost at it on the left, the Sylvian connects on each side, over a submerged but quite superficial gyrus, with the united postcentral sulcus.

The inferior lip of the Sylvian shows on the left the extremities of four, on the right of three, transtemporal depressions. One of these furrows on the left and one on the right effect a shallow communication with the superior temporal sulcus.

Of the terminal branches of the Sylvian the superior is 2.4 cm. in length on the left, and 2.6 cm. on the right side; they both end, as usual, in the supramarginal gyrus. The inferior ramus on the left runs 3.0 cm. horizontally and bifurcates; one of its branches, 2.5 cm. long, passes upward into the angular gyrus, while the other, 1.0 cm. long, descends backward. On the right

the inferior terminal branch runs 1.5 cm. backward and downward and joins, over a deep gyrus, the first temporal sulcus.

The superior terminal branch on the left makes two connections: one, shallow, posteriorly, with a sulcus running downward and forward from the interparietal, and one, deeper, anteriorly, with a horizontal furrow running backward from the lower part of the postcentral sulcus. The inferior branch on the left connects, not far from the bifurcation, over a submerged annectent gyrus, with the posterior portion of the first temporal sulcus.

On the right side the superior terminal branch of the Sylvian fissure is better developed than the inferior, and is deeper than the latter. It ascends for 2.0 cm. into the supramarginal gyrus, running parallel to the central fissure, and ends in a short T. The lower terminal branch descends for 1.3 cm., over two medium deep anastomotic fascicles, and joins the ascending ramus of the first temporal sulcus.

Annectent Gyri.—On the left a strong column, at medium depth, between parietal and temporal lobes, at the beginning of the lower terminal branch of the Sylvian. On the right a similar but more superficial column, at the beginning of the inferior branch, and another more posteriorly in the same.

CENTRAL FISSURE

	Left	*Right*
Length (in a straight line, with sliding compass)	9.0 cm. (50 % of the total length of the hemisphere)	8.6 cm. (48 %).[1]
Depth, maximum	2.3 cm.	2.5 cm.

The fissure begins on both sides within the Sylvian, probably by means of the subcentral sulci of Eberstaller.[2] The origin

[1] According to Schäfer (Quain's *Anat.*, 10th ed., III, 1, p. 143), "the length of the fissure in whites is about 2/5 (or 40 %) of the whole length of the hemisphere. It is relatively longer and more curved in the anthropoid apes than in man." (See additional measurements.)

[2] Cunningham (op. cit., 63) found a connection of the central and Sylvian in 19 % of hemispheres (of whites). Benedict (*Anat. Studien an Verbrecher-Gehirnen*,

of the central fissure is situated 0.6 cm. below the borders of the Sylvian on the left, and 1.5 cm. on the right It nearly connects on the right with the superior limiting sulcus of the insula. A short distance above the Sylvian border, the left central fissure shows a submerged, but not very deep, annectent gyrus; on the right there are two such fascicles in a similar location.

The form of the central fissure is quite tortuous, especially on the right. The left fissure, neglecting minor bends, is, from above downward and with reference to the frontal lobe, convex, concave, convex, concave, much convex, and nearly straight; that on the right, convex, concave, convex, concave, convex.

Each of the fissures sends a number of incisures into the adjacent convolutions. On the right, 3.3 cm. above the Sylvian, the central fissure connects, over a quite superficial annectent gyrus, with the postcentral sulcus.[1]

The two fissures show no submerged interruption.

The superior ends of the central fissures are situated almost opposite; distance from the same to the superior border, left, 0.5 cm.; right, 0.5 cm.[2]

Additional measures:

	Left	*Right*
(1) Origin of central fissure (on the lip of the Sylvian) to frontal pole[3]	7.3 cm.	6.5 cm.
(2) Superior extremity of central fissure to frontal pole	10.9 cm.	10.8 cm.

Wien, 1872, p. 96) found a complete connection in 18 and an incomplete one in 6 of 38 hemispheres examined. Giacomini (*Varietà d. circonvoluzioni cerebrali dell' uomo*, Torino, 1882, cited by Cunningham) found such a connection only in 21 among 336 hemispheres. Retzius (*Das Menschengehirn*, 1896, I, p. 100) found the connection in 23 % of the hemispheres of Swedes.

[1] Retzius observed, on the brains of whites, anastomosis of the Rolandic fissure with the inferior postcentral sulcus in 9 %, with the superior in 3 % of the cases.

[2] Cunningham (op. cit., p. 162), in 52 hemispheres of white children and adults, found the following conditions in this respect: "(a) In 60 % the upper end of the fissure cut the upper border of the hemisphere and appeared on the inner surface; (b) in 21 % it just reached the upper border; and (c) in 19 % it fell short of the upper border."

[3] This and the following measures are the horizontal distances between vertical planes at the points mentioned.

	Left	*Right*
(3) Origin of central fissure to occipital pole....	10.7 cm.	11.4 cm.
(4) Superior extremity of central fissure to occipital pole.....	7.1 cm.	7.1 cm.

Reduced to per cent. of the total antero-posterior diameters of the hemispheres, these distances are:

	Left	*Right*
(1).....	40.6 %	36.3 %
(2).....	60.6 %	60.4 %
(3).....	59.4 %	63.7 %
(4).....	39.4 %	39.6 %

PARIETO-OCCIPITAL FISSURE

The fissure appears on both sides like a direct and equally deep continuation of the calcarine stem. It runs on each side, in nearly a straight line, upward and slightly backward to, and on the left 2.1 cm., on the right 1.5 cm., over, the superior border of the hemisphere. The extremity forms on each side a small T, which is surrounded by a pronounced paroccipital gyrus.

The average depth of the fissure is 2.3 cm. on the left and 2.3 cm. on the right side; its length, from its junction with the calcarine stem to the superior border is on the left 4.0 cm., on the right 4.2 cm.

The fissure on the left connects over a submerged but quite superficial gyrus with the sub-precuneal sulcus, while that on the right shows a slightly deeper connection with a sulcus from the cuneus.

There are only a few very deep annectent bundles within each fissure.

CALCARINE STEM AND SULCUS

The stem is simple, its course on each side slightly wavy. Its length is 2.6 cm. on the left, 3.3 cm. on the right; its average depth on both sides about 1.5 cm.; at its junction with the pario-occipital it equals the latter in depth.

Both calcarine sulci communicate with the stem over a submerged but not very deep gyrus. The left sulcus is nearly

straight; the right one describes anteriorly a moderate curve. The sulcus on the left is free from connections and gives off but two small incisures; that on the right connects superficially with a cuneal sulcus and sends from its curve a deep branch, 1.0 cm. long, downward to the basi-mesial border.

The calcarine sulcus extends on both sides to the dorsal surface of the occipital lobe, and terminates in a small bifurcation. The most distal point is on the left 1.55 cm., on the right 1.3 cm., in a straight line beyond the border of the hemisphere.

The length of the calcarine sulcus from its junction with the stem to the border of the occipital lobe is 4.6 cm. on the left, 4.8 cm. on the right side. It is on both sides much shallower than the stem.

There are a number of connecting fasciculi within the two calcarine stems and sulci. On the left there is a deep bundle in about the middle of the stem and reaching from the base of the stem to the point of the cuneus; there are also two bundles at medium depth behind the junction of the stem and the sulcus and passing from the gyrus lingualis to the cuneus; and there is another fascicle of medium depth in the sulcus, about 2 cm. from the occipital border. On the right side we find similar annectent gyri in similar locations, but the bundle in the stem passes downward to the bottom and does not visibly reach the cuneus.

COLLATERAL FISSURE

This furrow is of considerable extent, particularly on the right. Its total length, in a straight line, is 8.15 cm. on the left, and 11.3 cm. on the right.

The anterior termination of the fissure is on both sides free and simple; it is distant from the pole of the temporal lobe on the left 5.7 cm., on the right 2.9 cm.

On both sides, nearly in the line of continuation of the collateral fissure and incising the antero-mesial border of the temporal lobe, is found a well-developed fissura rhinica. This furrow is

particularly marked on the left side where the collateral is shorter.

Posteriorly, the left collateral fissure terminates in a line about 3 mm. from the border of the hemisphere, while on the right it reaches the border. Both of the fissures connect, each by a shallow sulcus, with the third temporal.

Each collateral gives off several incisures. In the posterior half of both fissures are found, at medium depth, annectent bundles which pass between the fusiform and lingual lobules.

CALLOSO-MARGINAL FISSURE

The gyration on the mesial surface of this brain presents several very interesting modifications. The calloso-marginal is duplicated on the left and almost triplicated on the right side. The main fissure is on both sides throughout continuous and connects freely and deeply with the paracentral. It is on both sides doubled by a pronounced mesial frontal sulcus. This is deep and continuous on the left, more shallow and interrupted by an isthmus on the right. In addition the right callosal gyrus is traversed along its entire superior extent by a shallow, interrupted sulcus, which runs parallel with the calloso-marginal fissure and separates the surface of the callosal into two nearly equal superior and inferior portions.

The left calloso-marginal begins in a simple way below the genu of the callosum ; the right proceeds from a subrostral sulcus which curves about a lobule on the posterior extremity of the mesial portion of the frontal lobe.

During its course, each of the calloso-marginal fissures gives off a few small branches or incisures. On the left, as well as on the right, four such small branches indent the superimposed part of the superior frontal gyrus.

There is on both sides a well-developed rostral, and on the right also a transverse subrostral sulcus ; there is also a fair representation on each side of the postlimbic sulcus.

The paracentral sulci are well curved and both end on the dorsal surface of the hemisphere: the left in a line, 1.5 cm. from the median border and 0.7 cm. behind the superior extremity of the central fissure; the right in a T, with the posterior branch much shorter than the anterior, 1.6 cm. from the median border of the hemisphere and 0.5 cm. behind the terminus of the central fissure.

The average depth of the calloso-marginal is 1.0 cm. on the left, 1.3 cm. on the right; that of the paracentral 1.5 cm. on the left and 1.8 cm. on the right side.

Annectent Gyri.—There are in the calloso-marginal five or six deep bundles on the left and seven or eight such bundles on the right, passing between the callosal gyrus, the superior frontal convolution, and the paracentral lobule.

MINOR FISSURES OR SULCI

Frontal Lobe.—The *superior frontal sulcus* on the left is a continuous furrow, which runs, in a tortuous way, from the anterior portion of the orbital surface to within a few millimeters of the superior precentral sulcus. On the right a similar but somewhat less tortuous furrow extends from the orbital border of the frontal lobe to the superior precentral sulcus, connecting with the same.

Each of the sulci sends off a number of transverse branches and incisures. That on the left communicates with the medial frontal sulcus of Eberstaller and with the vertical furrow anterior to the precentral sulci; that on the right connects with the medial frontal and the superior precentral sulcus.

The depth of each of the superior frontal sulci averages about 1.5 cm., the maximum depth measured being 2.8 cm. (on the left).

Mesially from the superior frontal sulci we find on each side of the brain, but particularly on the left, small segments of Cunningham's mesial sulcus.

The *medial frontal sulci* of Eberstaller are only fairly well represented.

The *inferior frontal sulcus* can be isolated with more facility on the left than on the right hemisphere; it does not connect on either side with the inferior precentral sulcus.

The left inferior frontal sulcus is in two portions; it begins posteriorly 3 mm. in front of the middle of the inferior precentral, intersects the anomalous vertical furrow, and terminates about 2 cm. in front of this furrow in a shallow Y. A few millimeters inferiorly and posteriorly to the lower terminal branch of this Y begins the second portion of the sulcus. This portion consists mainly of the sulcus radiatus, and sends six branches into the adjacent convolutions.

On the right side, that part of the vertical furrow which corresponds to the diagonal sulcus connects, 1.9 cm. above the Sylvian, with a short but deep T branch, 1.0 cm. long, which runs directly forward and probably represents the posterior extremity of the inferior frontal sulcus. The anterior portion of the same consists of the sulcus radiatus, possibly joined with the fronto-marginal sulcus. This portion, as on the left, shows six branches. One of these connects inferiorly with the anterior branch of the presylvian; another ascends to within a short distance of the median frontal sulcus.

A small independent depression indents on each side the surface of the pars triangularis of the inferior frontal gyrus.

All the frontal sulci show numerous submerged annectent gyri.

The *anomalous vertical furrow* which runs on each side anterior to and nearly parallel with the precentral sulci, has been referred to in the description of the Sylvian.

The *precentral sulcus* consists on each side of two independent, radiating segments of considerable depth. On the left these segments are isolated; on the right the superior connects, over a deep annectent bundle, with the first frontal sulcus, while the

inferior joins and probably forms the superior part of the anomalous vertical furrow.

Above the superior precentral there is on each side an independent, triradiate sulcus extending to the upper border of the hemisphere and bounding laterally the ascending frontal convolution; it looks like a third part of the precentral.

Orbital Surface.—The *Sulcus Olfactorius* presents a typical conformation. It is a long depression, running from 1.0 cm. at base to 0.5 cm. at terminus laterally to the median fissure, quite deep, terminating on the left side in a free line and on the right side in a small Y. Slightly anteriorly to the end a small transverse sulcus crosses the border of the hemisphere on the left, and a small semicircular sulcus indents the border on the right side. The parts of the first frontal gyrus traversed by the olfactory sulcus are, as previously stated, quite prominent.

Besides the olfactory, each of the orbital parts shows two other antero-posterior sulci. One of these, the outer, is apparently the orbital sulcus. Its form on the left is that of a Y, or of a K with the lower branch interrupted, while on the right side it forms a somewhat crooked X.

Both of these figures are situated somewhat more externally than is usual, and between them and the olfactory furrows we find on each side a distinct separate sulcus. On the left this sulcus consists of two branches and indents the first frontal convolution. The anterior branch communicates with the main ramus of the orbital sulcus. On the right side the sulcus begins near the root of the olfactory nerve and then passes forward, bounding the first frontal gyrus.

The transverse orbital sulci present nothing extraordinary.

Parietal Lobe.—The *postcentral sulcus* shows neither on the left nor on the right any superficial interruption.[1] It connects on

[1] According to Cunningham, in the brains of adult Irishmen the postcentral sulcus was found complete and separated from the interparietal sulcus (as on the right in the Eskimo brain) in 11%; it was found complete and communicating with the interparietal (as on the left in the Eskimo brain) in 60% of the hemispheres.

both sides with the Sylvian and on the left side also with the interparietal sulcus.

The left postcentral is very long, reaching to within 0.5 cm. of the superior border of the hemisphere, where it connects, over an imperfectly submerged gyrus, with a vertical sulcus from the precuneus.

The connection of the postcentrals with the Sylvian is not effected by the trans-postcentral sulci.

The course of both postcentral sulci, and particularly of that on the left, is tortuous.

Each sulcus gives off during its course several incisures and small branches. On the left side, 1.4 cm. above the Sylvian border, a quite deep branch passes backward through the supramarginal convolution and communicates with the superior terminal branch of the Sylvian. Three cm. above the Sylvian the left postcentral connects, over a submerged gyrus, with the interparietal sulcus. Opposite this junction a branch, 1.4 cm. long and looking like the anterior terminus of the interparietal, passes forward and slightly upward into the ascending parietal gyrus.

In its upper third the left retrocentral sulcus gives off three smaller branches. The lowest one of these passes backward; the middle one indents the ascending parietal gyrus and ends near the central sulcus; the third branch passes upward, ending in front of the dorsal termination of the paracentral fissure. The main limb of the sulcus then bends backward and runs toward the aforementioned connection with the precuneal.

The right postcentral sends off four branches or incisures, one of which, 2.0 cm. long, passes backward from near the middle of the sulcus. Two and a half cm. above the Sylvian the right postcentral connects, over a submerged but not deep fascicle, with the central fissure.

Superiorly the sulcus divides into two branches, the anterior 1.4 cm., the posterior 2.4 cm. in length, which surround, in the form of a broad Y, the extremity of the paracentral sulcus.

Each postcentral shows in its course a number of more or less deep annectent fascicles.

The trans-postcentrals are in their usual position, but only that on the left (as was the case with the trans-precentrals) reaches the dorsal surface of the hemisphere.

The *interparietal sulcus* on the left commences, with a small T, somewhat inferiorly and anteriorly to the end of the superior terminal Sylvian, 1.8 cm. from the Sylvian bifurcation. Seven millimeters above its beginning the sulcus connects, over a submerged but not deep gyrus, with the postcentral. From this point the interparietal runs in a slight curve 4.2 cm. upward and backward and joins freely the paroccipital sulcus. The interparietal gives off three larger branches, one of which runs downward, into the supramarginal, and the other two upward, into the superior parietal gyrus. There are within the sulcus several deep but no interrupting connecting bundles.

On the right side we find an anomalous deep furrow, uninterrupted except by very deep bundles, running from a point well down between the supramarginal and angular gyri, in a wavy course, parallel in the main with that of the postcentral sulcus and central fissure, to and 1.0 cm. over the superior border of the hemisphere, ending on the precuneus.

From this furrow, above its middle, begins, over a depressed but still partly visible gyrus, the horizontal part of the interparietal. This is angular, but 0.8 cm. long (in a straight line), and connects with the paroccipital.

The vertical furrow separates a stout and prominent convolution which runs parallel with the ascending frontal and ascending parietal gyri. The superior portion of the vertical furrow lies, independent of both, between the postcentral and the anterior curve of the paroccipital sulcus.

The minor parietal sulci will be mentioned with the description of the convolutions.

Occipital Lobe.—The *anterior* as well as the *lateral occipital*

sulcus is fairly well represented on both sides. The anterior sulcus on the left connects with the ascending branch of the superior temporal, the anterior and lateral furrows on the right with the anomalous *medio-temporal* sulcus (q. v.). The lateral sulcus on the left is in the form of an H and is without connections.

Temporal Lobe.—The sulci on the superior or intrasylvian surface of the lobe have been mentioned.

The lateral surface is higher on the right than on the left side. Its sulci are on both sides deep and the gyrations distinct.

The *superior or first temporal sulcus* begins on both sides in a line near the pole of the temporal lobe. It is preceded on the left by a small transverse furrow, on the right by a shallow depression.

The horizontal portion of the superior temporal is continuous on both sides. Its form is wavy on the left, more straight on the right side. It terminates on the left in a line 1.8 cm. posteriorly to the Sylvian bifurcation and within 0.3 cm. of the inferior terminal Sylvian. The ascending portion is separate. On the right the horizontal portion runs to a point about 1.2 cm. posterior to the Sylvian bifurcation, connects with the inferior terminal Sylvian, and proceeds without interruption backward and upward as the ascending ramus.

The horizontal portion on the left connects, 1.6 cm. before its posterior end, over a submerged but not deep gyrus, with a parallel, *medio-temporal*[1] sulcus, 4.4 cm. long, which separates the posterior half of the middle temporal gyrus into an inferior and a superior portion. The horizontal branch on the right connects, by means of a shallow transverse sulcus, with the second temporal, and more posteriorly as well as quite superficially with the *medio-temporal.*

The ascending branch on the left begins with a short vertical

[1] This term suggests itself from some similarity of this to the medio-frontal sulcus of Eberstaller.

part that connects with the inferior terminal Sylvian. It runs backward and slightly upward, almost in line with the horizontal portion. It connects with the ascending part of the second temporal, and finally joins the anterior occipital sulcus.

On the right the ascending branch runs in an angular manner upward and backward, terminating a short distance below the paroccipital. This branch also has a shallow connection with the *medio-temporal.*

The *medio-temporal* sulcus is even better marked on the right than on the left. Beginning somewhat posteriorly to a vertical from the Sylvian bifurcation, it runs backward and upward, parallel with the ascending portion of the first temporal, to the occipital lobe. It connects with both the horizontal and ascending portions of the first temporal and also with the anterior as well as with the lateral occipital sulci.

Both the first and the *medio-temporal* sulci send off shorter branches and all show deep connections passing between the adjacent gyri.

The mean depth of the horizontal ramus of the left superior temporal sulcus is 1.8 cm., that of the right, 2.1 cm. The ascending rami are not so deep. The depth of the *medio-temporals* is less than that of the horizontal, but slightly greater than that of the ascending portion of the first temporal sulci.

The *second* or *middle temporal* sulcus is composed on each side of two separate segments; each of these shows some secondary ramifications.

The anterior portion on the left commences with a curve, passes in a wider curve backward and slightly upward, and terminates, nearly vertically below the central fissure, with several marked radiations. The posterior left segment begins in a Y slightly above and posteriorly to the termination of the first part, and runs slightly downward and backward, to and along the inferior border of the hemisphere, terminating in a simple manner about 1.6 cm., in a straight line, from the occipital pole, under the

lateral occipital sulcus. Two and seven-tenths of a cm. anteriorly to its end this segment gives off, over a deep annectent fascicle, an ascending portion, which runs with several bends directly upward to connect with the ascending part of the first temporal sulcus.

On the right side, the first portion of the second temporal has its simple beginning 1.0 cm. in a straight line from the pole of the temporal lobe; it passes 4.6 cm. backward and ends in a small bifurcation. A short distance anteriorly to this bifurcation the sulcus communicates with the first temporal.

The posterior segment on the right begins a little posteriorly to the bifurcation of the first part, in the form of a doubly curved, nearly transverse line. This line bends, runs backward and downward, reaches the inferior border, sends a 1.3 cm. long branch backward and inward into the third temporal gyrus, passes again to the dorsal surface of the hemisphere, and ends in a long Y figure, the lower extremity of which reaches to below the lateral occipital sulcus.

The *third* or *basitemporal sulcus* is unusually well developed, particularly on the left side.

The sulcus on the left is continuous, somewhat wavy in form, and measures 9.3 cm. in length (in a straight line). It effects a shallow connection with the collateral.

The right sulcus consists of three large separate segments, which extend from near the pole of the temporal lobe to within 1.7 cm. of the occipital pole. The segments send off a number of radiating branches, and the posterior one connects with the collateral.

On both sides the third temporal sulcus contains a number of submerged, more or less deep, annectent fascicles.

THE INSULA

The conformation of the surface of the island is quite similar on the two sides of the brain (figs. 57, 58).

The marginal or limiting sulci of the insula are very deep, especially anteriorly, and they are continuous, except over the antero-inferior extremity or pole of the insula.

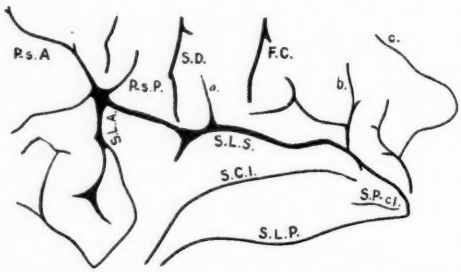


FIG. 57—Left insula. S.L.S., S.L.A., S.L.P., Sulci limitantes insulæ, superior, anterior, posterior; S.C.I., Sulcus centralis insulæ; S.P-c. I., Sulcus post-centralis insulæ.

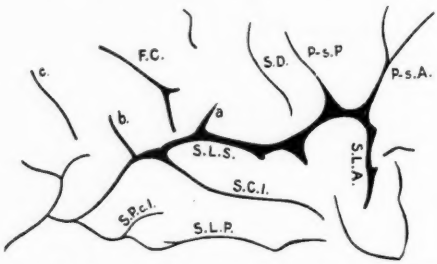


FIG. 58—Right insula. P-s.A., Presylvian anterior; P-s.P., Presylvian posterior; S.D., Sulcus diagonalis; a, Trans-precentral sulcus; F.C., Central fissure; b, Trans-postcentral sulcus; c, Postcentral sulcus.

The superior limiting sulcus communicates on both sides with the two branches of the presylvian; it also gives off on each side two short branches upward, and a deep short incisure downward, into the insula itself. The average depth of the superior limiting sulci is 2.8 cm., and in the course of each there are several strong annectent fascicles passing between the lobes of the island and the overlying operculum.

At the posterior inferior angle of the insula there are two strong, almost superficial annectent bundles, connecting the superior temporal gyrus with the insula; there is on each side also a strong connecting bundle between the anterior extremity of the posterior lobe of the insula and the superior temporal convolution.

The central sulcus of the insula is independent on the left, but it communicates with the superior limiting sulcus on the right side. The central sulci average only 0.5 cm. in depth, and each shows anteriorly a submerged anastomotic fascicle.

Besides the above sulci, each insula shows a small furrow which divides its posterior lobe into superior and inferior portions (sulci retrocentrales insulæ). There is also on each side a curving but not very deep sulcus which passes from below over the pole of the insula. This sulcus ends freely on the anterior lobule of the insula on the right, but joins the anterior limiting sulcus on the left side.

The anterior and posterior lobes of the insula are well defined and show the ordinary planes. Gyri breves fairly well marked.

CONVOLUTIONS

Frontal Lobe. Dorsal Surface.—The frontal gyri are rather more complex and tortuous than in average whites. The dorsal portion of the left *superior frontal gyrus* is slightly narrower in front than that of the right (left 2.85 cm., right 3.05 cm.), but somewhat broader posteriorly (left 2.8 cm., right 2.5 cm.). In about the middle, the left gyrus sends downward a prominent, shoe-like convolution, which indents the middle frontal gyrus. The dorsal parts of both superior frontal convolutions show, besides the segments of the sulcus mesialis of Cunningham, a considerable number of transverse depressions.

The *middle* or *second frontal gyrus* is on both sides of an irregular form and partly subdivided by the medial frontal sulcus. The posterior portion of the convolution on the left is especially well developed, and is separated from the anterior portion by the vertical furrow. Both middle frontal gyri have numerous superficial and deep connections with the neighboring convolutions.

The *inferior* or *third frontal gyrus* is in this brain, contrary to the general rule, more extended antero-posteriorly and more redundant on the right than on the left side. This excess is especially marked in the right middle or triangular part (cap of Broca).

The convolution shows numerous connections; the orbital and

triangular parts connect on both sides superficially with the middle frontal gyrus.

The *ascending frontal* convolution is somewhat stronger on the right than on the left. It is on both sides most slender in its middle fourth. It is on both sides continuous from the Sylvian fissure to the superior border of the hemisphere. Superficial connections.—On the left: a broad isthmus to the inferior frontal; a superficial annectent gyrus to the middle frontal; similar gyrus to superior frontal; and, at the median border of the hemisphere, three superficial annectent gyri, one to the superior frontal, one to the paracentral, and one to the ascending parietal convolutions. On the right there is a broad superficial connection with the pars basilaris of the inferior frontal; and similar connections anteriorly with the middle and superior frontal, and superiorly with the paracentral and ascending parietal gyri.

Mesial Surface.— The *left marginal gyrus* is considerably higher than the right one. Its height is, from the orbital surface to the calloso-marginal fissure, on the left 2.2 cm., on the right 1.8 cm.; opposite the anterior pole, on the left 3.2 cm., on the right 2.5 cm.; and the average height of the upper part is, on the left 2.6 cm., on the right 2.3 cm. On both sides the marginal and the calloso-marginal gyri stand to each other, as to size, in an inverse relation.

The inferior extremity of each marginal gyrus is marked by the sulcus rostralis transversus and connects almost superficially with the inferior extremity of the limbic lobe (carrefour olfactif of Broca). The posterior extremity of the marginal gyrus communicates on the left by two superficial, on the right by one superficial and one deep, annectent gyri with the paracentral lobule.

As to the convolutions on the orbital surface of the frontal lobes, on the left the first and third frontal gyri, both markedly developed, join a little posterior to the middle of the surface, and

the second frontal gyrus forms a wedge anteriorly between them. On the right, the second passes between the first and third gyri as a narrow band to the root of the olfactory nerve, where it joins the extremities of the other frontal convolutions.

The olfactory tracts and bulbs show nothing unusual.

The Parietal Lobe.—The *ascending parietal gyrus* is somewhat more voluminous on the left hemisphere (average width on the left about 1.2 cm., on the right about 1.0 cm.). The base of the convolution on the left measures, antero-posteriorly, 3.2 cm., of that on the right 1.9 cm. Both gyri show a constriction between their lower and middle thirds, and a marked development of the latter portion. The upper third is on each side slender, tapering, and not raised fully to the niveau of the neighboring parts.

The upper extremity of the gyrus connects superficially with the ascending frontal, paracentral, and superior parietal convolutions; the lower part connects, by means of submerged but not deep fascicles, with the ascending frontal and supramarginal gyri.

The *superior parietal gyrus* is throughout somewhat larger on the left side. Anteriorly it communicates on both sides superficially with the ascending parietal, and in a similar way posteriorly with the superior occipital convolution. Inferiorly there are numerous submerged fascicles of connection between the superior and inferior parietal gyri.

The left superior parietal convolution is separated by transverse sulci into two parts, the middle of which is very redundant. The right gyrus is somewhat similarly divided into two portions, of which the anterior is the more redundant.

The convolution shows on each side a number of lateral and surface indentures.

The *paroccipital gyrus* forms on each side a well-marked loop, which surrounds the extremity of the parieto-occipital fissure. The left gyrus is larger than the right one.

The *inferior parietal convolution* as a whole is larger on the

right, compensating for the smaller size, on that side, of the superior parietal.

The *supramarginal gyrus* is fairly well defined on the left and is divided from the angular gyrus by a vertical branch proceeding from the interparietal sulcus (the sulcus intermedius primus, Jensen, Eberstaller). On the right side the marginal convolution is larger and more redundant; its operculum, or the triangular part between the two terminal branches of the Sylvian fissure, is especially well developed. The gyrus is bounded posteriorly by the inferior extremity of the vertical parietal sulcus.

The *angular* and *postparietal gyri* are nicely differentiated loops, separated by a vertical depression (sulcus intermedius secundus, Eberstaller) on the left, but are of irregular form and separated only from below by the extremity of the ascending branch of the superior temporal sulcus on the right side.

All the parts of the inferior parietal convolutions show minor lateral or surface indentations, and numerous deep as well as superficial connections.

The *paracentral lobule* is much better isolated anteriorly on the left than on the right. The left lobule is also slightly more redundant, though slightly less high and not any longer than that on the right side.

The surface of the left lobule is indented by two Y-shaped and one lineal, that of the right by one Y-shaped and two lineal, sulci.

Precuneus.—This lobule is separated completely on the left, incompletely on the right, from the limbic gyrus, by the posterior limbic or subprecuneal sulcus. The surface of the left precuneus is indented by four vertical sulci, two of which connect with the posterior limbic, while the other two pass over the border of the hemisphere, where the anterior communicates with the posterior terminal branch of the postcentral sulcus, and the posterior one forms the anterior boundary of the paroccipital gyrus. On the right, the precuneus presents a Y-shaped sulcus in connection

with the intralimbic and postlimbic sulci, while its superior portion is indented by the terminus of the anomalous vertical parietal sulcus.

Both the paracentral lobule and the precuneus show numerous deep, besides the superficial, connections with the adjacent gyri.

Occipital Lobe.—The lobe measures, from the antero-inferior extremity of the cuneus to the occipital pole, on the left 4.7 cm., on the right 4.9 cm., which is respectively 26.1 % and 27.4 % of the whole length of the hemisphere (see also additional measures).

The gyration of the lobe in the Eskimo brain under consideration is not inferior to that met ordinarily in whites. It presents, as is often the case, some difficulty to analysis, but no very extraordinary features.

The *cuneus* is bounded by almost straight lines. It is lower, but longer, on the right hemisphere. Its superior border is indented on the left by two, on the right by one incisure. Its surface shows on the left an independent triradiate sulcus with branching extremities; on the right a large, somewhat Y-shaped sagittal sulcus, which connects with the parieto-occipital, and a quadriradiate sulcus, one of whose branches connects with the collateral.

Temporal Lobe.—The *superior temporal gyrus* is considerably stronger on the right than on the left side (mean height of the left, 0.8 cm.; of the right, 1.1 cm.). The left gyrus is particularly slender and is slightly depressed in its middle.

The left convolution is interrupted by one of the transtemporal furrows which connects with the superior temporal sulcus.

The right superior temporal gyrus appears to be composed of three imperfectly separated portions, namely, a long anterior part, reaching to within 1.0 cm. of the bifurcation of the Sylvian, separated from the rest of the gyrus by two incisures (one superior and one inferior), which almost meet, and a shallow depression. The more anterior of the following two parts is in the

form of a larger oblong lobule, situated between the depression just mentioned and the connection of the inferior termin. Sylvian with the superior temporal sulcus. The third part is a small, partly depressed isle projecting from the second part into the Sylvian and separated from that part by a shallow sulcus.

The *middle* or *second temporal gyrus* is also more voluminous on the right side; both are quite redundant.

The anterior half of the convolution on the left is curved, on the right straight and wedge-shaped. The posterior half on each side, somewhat less redundant, is divided into two parallel, nearly equally strong portions by the secondary *medio-temporal sulcus*.

The anterior portion of the right gyrus is indented by two vertical sulci proceeding from the second temporal; the anterior of these connects with, while the posterior reaches very near to, the first temporal sulcus.

The superior posterior portion of the right gyrus is separated by a connecting branch between the first and medio-temporal sulci.

Both gyri show a number of more or less marked lateral incisures and a few minor surface furrows.

The inferior or *third temporal gyrus* lies, on both sides of this Eskimo brain, almost wholly on the inferior surface of the temporal lobe. It is easily isolated.

The gyrus is on both sides strongest in about its middle third, its anterior and posterior extremities tapering a little. It is on each side incised by a number of incisures which pass into it from both the second and third temporal sulci, but it is nowhere totally interrupted. In its middle enlargement the gyrus is on each side indented by an independent ramifying sulcus, which on the left has the form of a double joined Y, and on the right approaches the form of H. Excepting the anterior and posterior, the gyrus has one superficial connection on the left (with the anterior portion of the second temporal) and two on

the right side (with the anterior part of the second temporal and with the fusiform lobule).

The *fusiform gyrus*, well defined on both sides, is throughout more voluminous on the right. The left gyrus shows, near its posterior third, a shallow interruption. The borders of both convolutions are indented by a number of more or less pronounced incisures. The gyri show numerous submerged connections with the third temporal and the lingual convolutions.

The *lingual gyrus*, well defined, connects on both sides, anteriorly, superficially, and freely, with the gyrus hippocampi; posteriorly, near the occipital pole, with the fusiform lobules.

The gyrus is partly divided on both sides into halves by a branch from the collateral fissure. The anterior portions are somewhat tongue- or pear-shaped, the tapering ends connecting with the hippocampal gyri, and each is indented by a quite prominent sagittal sulcus. The posterior extremity of this sulcus, on the right, connects with a branch from the collateral. The posterior half on the left is nearly straight and more slender than the anterior one; that on the right forms a marked loop. The surface of the posterior portions, also, is indented on each side by a small, mainly sagittal depression.

THE LIMBIC LOBE

This lobe differs remarkably on the two sides. It is much larger over almost its entire extent on the right side, as will be indicated by the following measures (taken between the sulcus of the callosum and the external boundary of the gyrus):

	Left	*Right*
Antero-inferiorly, below the rostrum (above Broca's carrefour olfactif)	0.3 cm.	0.5 cm.
Anteriorly (horizontally)	0.5 cm.	1.0 cm.
Superiorly, beneath the first frontal or marginal gyrus	0.85 cm.	1.5 cm.
Superiorly, below the paracentral lobule	1.5 cm.	2.1 cm.
Superiorly, below the precuneus	2.0 cm.	2.6 cm.
Posteriorly, opposite the cuneus	1.6 cm.	1.4 cm.

The lobe begins on both sides at the well-developed olfactory lobule or space of Broca, below the rostrum of the callosum. Its ascending portion and a part of its horizontal portion are entirely smooth on the left; on the right side the external boundary of these parts shows many depressions, and the horizontal part is traversed by the previously described sagittally running, shallow sulcus.

All the parts of the limbic lobe behind the line which bounds anteriorly the paracentral lobule are much more developed than the parts anterior to this line. On the left this posterior portion of the lobe is traversed by a number of transverse sulci and has the appearance of being composed of four or five loops lying in close apposition. On the right, there is a somewhat similar formation of loops, but their outline is more angular. Directly beneath the splenium both lobes become very narrow and soon after blend with the hippocampal convolutions.

Deep bundles connect the limbic lobe on each side with the mesial part of the first frontal gyrus and the parietal lobule. The connections of the lobe with the precuneus are on the left all submerged, though not deep, while on the right side besides these deep bundles there is also, posteriorly, a superficial annectent gyrus between the two structures. A few deep fascicles pass between the lobe and the cuneus and lingual gyrus.

HIPPOCAMPAL GYRUS

This gyrus is somewhat larger on the right side. It is almost isolated externally on the right, only a small annectent gyrus passing from it, between the fissura rhinica and the inferior temporal sulcus, to join the fusiform convolution. On the left side this connection is broader. The surface of the gyri is smooth. Both gyri connect superficially with the lingual convolutions. The *uncus* is well marked on both sides.

The parts within the limbic lobe show nothing extraordinary. The callosum is exceptionally strong and very nearly equal on the two sides. Its measurements are as follows:

Diameter antero-posterior maximum	7.9 cm.
Maximum height of anterior enlargement	1.45 cm.
Maximum height of posterior enlargement	1.5 cm.
Maximum height between the enlargements	1.0 cm.
Minimum height between the enlargements	0.75 cm.

The dentate gyrus is well differentiated and the fimbria well developed.

Cerebellum, Pons, Medulla

All these parts appear to be very well developed; they are symmetrical and present no gross deviation from the shape and conformation of the same parts as generally observed in whites.

Measurements of Cerebellum

Height maximum	5.7 cm.
(in fresh brain	5.8 cm.)
Diameter antero-posterior maximum [1]	6.8 cm.
(in fresh brain	7.0 cm.)
Width maximum [2]	10.4 cm.
(in fresh brain	10.6 cm.)
Antero-posterior length of worm	4.3 cm.
Maximum height of worm	4.0 cm.
Maximum depth of anterior fossa	2.2 cm.
Maximum depth of posterior incisure	1.3 cm.
Depth to the top of the worm (from a plane corresponding to the highest points on each cerebellar hemisphere)	1.3 cm.

Measurements of the Pons

Width maximum	3.5 cm.
Height (vertical) from fourth ventricle	2.9 cm.
Length (antero-posterior)	2.5 cm.

Measurements of the Medulla

Thickness maximum infero-superiorly	1.8 cm.
Thickness maximum laterally	2.0 cm.

[1] About 1.0 cm. from the median line on each side.

[2] At about the junction of anterior third with posterior two thirds.

THE CEREBELLUM

The great horizontal fissure encircles the organ completely. It averages 1.6 cm. in depth. On its bottom many slender rods are seen to pass from one part of the cerebellum (superior) to the other (inferior), all directed obliquely outward. (There are similar rods within all the other sulci.)

All the usual lobes of the upper surface (as well as all the divisions of the worm) are present and well developed. There are two lobules situated laterally to the lingula (which faces forward); these two lobules are joined 2 cm. outward to the alæ lobuli centralis. These last are very small and hidden. The lingula, with the wings and the central lobule, gives a very good appearance of a moth, with wings converging upward.

Central lobe small. Folium cacuminis double; uvula consists of eight segments of which the last two (in pyramid) are small.

The pyramid is breast-shaped, with the apex posteriorly and a deep notch anteriorly; into this notch are received the last two little segments of the uvula. The lateral masses are anteriorly separated and form two distinct parts, applied over the extremity of the uvula. The parts connect anteriorly by deep annectent fascicles with the cerebellum. Tuber portions small. None of the lobes and parts of the lower surface and lower worm present anything extraordinary.

SUMMARY OF THE MAIN PECULIARITIES OF KISHU'S BRAIN

As a whole, this Eskimo brain is heavier and larger than the average brain of white men of similar stature. The excess of weight over the averages of both Broca's and Manouvrier's specimens (averages which agree well with those obtained by Bischoff, Boyd, Sims, Huschke, and other observers) amounts to almost 150 grammes.

As to size, the average antero-posterior diameter of the white male brain ranges, according to Huschke, between 16.0 and 17.0

cm. (mean 16.5 cm.), and the average maximumlateral diameter 14.0 cm. The mean of these measures, which largely removes the disturbing element of the shape of the brain, is 15.25. The crude measurements of Kishu's brain amount, for the length, to 18.0 cm. for the left and 17.9 cm. for the right hemisphere, and 13.6 cm. for the maximum breadth of the cerebrum. These figures give us the mean of 16.5, which is to that in whites as 108.2 to 100.

The different parts of the brain do not show the same *relative* weight proportions as they do in the average white brain, and the same is true of the relative size of the principal parts of the cerebrum. The cerebellum, and particularly the pons with the bulb, is relatively somewhat heavier in Kishu than in whites; while as to the main cerebral parts the most remarkable feature is the relative smallness of the parietal portion (see additional measurements).

In its external conformation this Eskimo cerebrum rather exceeds that of an average white male in the number, extent, and depth of the sulci, and in the complexity of the gyrations.

Both hemispheres, and especially the right one, show a generally marked tendency to vertical gyration. The left side shows one, the right two, large, anomalous, composite, vertical furrows. The gyration of the left hemisphere is in general somewhat more complex than that of the right one.

The pars triangularis of the inferior frontal convolution, the temporal lobe, inferior parietal gyrus, and limbic lobe are all larger on the right than on the left; on the other hand, the mesial part of the superior frontal gyrus, the middle frontal gyrus, the paracentral lobule, the precuneus, and the mass of the occipital lobe, are larger on the left than on the right side.

There is a great length of the postcentral sulci, particularly of that on the left. The left Sylvian (main limb) is longer, the left central fissure is situated (in a horizontal direction) slightly more posteriorly and is slightly more vertical than the right. There is

a bilateral, longitudinal division of the mesial part of the superior frontal gyrus and a tendency on the right to a similar division of the limbic lobe; and on each side there is a pronounced mediotemporal sulcus, dividing sagittally the posterior part of the middle temporal convolution.

Besides those enumerated, there are many other interesting minor features of the brain which need not be repeated.

Comparative Notes

The collection in the Medical Department of Columbia University includes, besides that of Kishu, the brains of three other Eskimo of the same party and originally from the same locality (Smith sound). One of these specimens is from Nooktah, a man older than Kishu; another from Atana, a woman of about the same or a little more advanced age than Kishu; and the third from Avia, a girl of ten to twelve years of age. A detailed report on these three brains is being prepared, as hitherto mentioned, by Mr E. A. Spitzka; my independent work on the same extends over those points only which are of particular interest in connection with the specimen here described, including the more important measurements.

The general gyration in these additional Eskimo brains, compared with that in average adult whites, is very good, particularly over the frontal lobes, in Nooktah, good in Atana, rather simple in Avia. In all the external conformation is more complex on the left hemisphere. The frontal gyration in Nooktah is not less complex than that in Kishu, but the whole brain of the latter is more developed and richer.

The insulæ are both quite exposed anteriorly in Atana, less so in Avia, and covered, or very nearly so, in Nooktah as well as in Kishu.

The ascending frontal gyri are both very strong in Atana, the ascending parietal gyri on both sides and the ascending frontal on the right in Avia.

The anterior and posterior portions of the presylvian are separate in all three brains, as in that of Kishu.

The central fissure, which in Kishu commenced in the Sylvian, has a similar origin on the right side in Avia; in all other instances it reaches near to the Sylvian. The superior termination of the fissure reaches the superior border in Nooktah and on the right in Atana, and passes slightly to moderately over it on the left in Atana and on both sides in Avia. In the girl the course of the fissure is remarkably vertical.

A longitudinal division of the mesial part of the superior frontal gyrus, found in Kishu, is also present complete on left, interrupted on right, in Nooktah; slightly incomplete on left, small traces on right, in Atana; and on the right in Avia.

The limbic lobe shows traces of longitudinal division, as on the right in Kishu, on the right in Nooktah, and on the left in Avia. The lobe that shows the traces of division is in both cases, so far as these traces extend, higher than that of the opposite side, as was also the case in Kishu.

A furrow somewhat similar to the pre-precentral vertical furrow in Kishu is seen on the right in Nooktah, while sinuosities, somewhat similar to the right vertical post-postcentral one in Kishu, occur on the left in Atana and on the right in Avia.

The postcentral sulcus is single in all cases, except on the left in Avia, where it exists in two portions.

The temporal lobe is slightly higher on the left side in Nooktah and Avia (see the measurements). The first temporal gyrus is in all cases moderately to well developed. The medio-temporal sulcus, though present in segments in Nooktah and Atana, is by no means as clearly distinguishable as in Kishu.

Broca's cap, or that part of the inferior frontal convolution situated between the two portions of the presylvian, is, contrary to what was the case in Kishu, in all these brains better developed on the left side.

The extremities of the occipital lobes are in all three brains of about equal size and not disproportionate as in Kishu.

Additional and Comparative Measurements

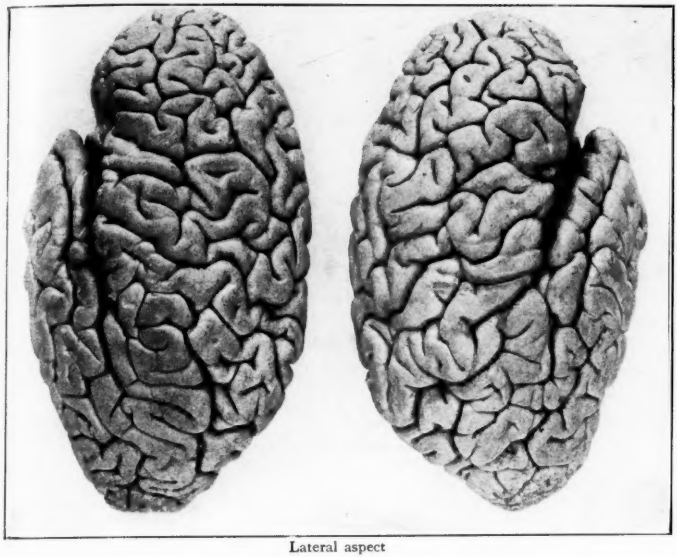
The subject of brain measurements is still in its infancy. Although many brains have been measured, particularly since Huschke and Broca, there is yet no standard system of encephalometry comparable with that of the measuring of the head or cranium. Every author of importance has thus far chosen his own points from which to measure, and there is no regulation of either the methods or instruments. There is no more important part of the body and at the same time no part with which more care and accuracy are required in measuring, than the brain, and these two conditions ought to prompt an early and thorough systematization of procedure. As it is, the brain measurements of one author can scarcely be compared or joined with those of any other.

The most disturbing factors in measuring the brain are, first, its softness and the consequent yielding and deformation of the organ when removed from the cranial cavity; this difficulty can now be effectually counteracted by a formaline-alcohol or formaline hardening of the organ before the opening of the skull.

The second important factor, which thus far has not received sufficient attention, is the different shape of the brain in different individuals and especially in different races. No one would think of comparing, or uniting in a series, the dimensions of a dolichocephalic with those of a brachycephalic skull, and similar distinctions should be established in brain measurements.

The choice of instruments is very important. Even if the tape only be used, considerable differences in the measurements are obtained according to the width of the same.

Some, and perhaps many, of the measurements of the brain carry valuable indications which we today do not appreciate. The knowledge of the organ will certainly progress, and meas-



Lateral aspect

Mesial aspect

THE HEMISPHERES OF KISHU'S CEREBRUM

urements taken with care, even if not essential now, may in the future be found of value.

A more detailed discussion here of these important matters would be somewhat irrelevant to the subject of this paper. The above remarks are thought to be a proper introduction to the following figures and comparisons.

The measurements of Kishu's brain, which was carefully preserved, between cotton, in a mixture of formaline and alcohol, are, as I have certified on the skull, almost absolutely correct. The brains of Nooktah, Atana, and Avia were preserved in a weak solution of formaline. Nooktah's brain is fairly well preserved and its measurements are apparently quite correct; the brains of Atana and Avia, however, have suffered a rather considerable change in form, and the absolute measurements of these specimens have but little meaning. The relative proportions of the various parts of the cerebrum were undoubtedly much less affected than the absolute measurements and are probably still fit for consideration.

The surface measurements were taken by a tape 0.8 cm. broad, while the diameters were obtained on a graduated plane (Mathieu's) and by the accurate sliding compass used in osteometry. Three repeated measurings gave fairly even, though in but very few instances exactly the same, results.

The points from which the various dimensions were taken and the methods will be explained with each measurement.

Measurements

APPROXIMATE LENGTH OF THE LINES OF NORMA ANTERIOR, KISHU:

	Left	*Right*
Antero-lateral lines.....	11.5 cm.	10.3 cm.
Anterior lines[1]	8.3 cm.	
Postero-lateral lines.....	8.2 cm.	7.8 cm.
Posterior lines[2]	5.9 cm.	

[1] Taken between two cardboards applied to the antero-lateral planes of the brain, the line measured touching the anterior surface of the frontal lobes.

[2] Obtained in a way similar to that of the anterior lines.

MAXIMUM LENGTH OF THE HEMISPHERES

	Left	*Right*
Kishu	18.0 cm.	17.9 cm.
Nooktah	16.8 cm.	17.0 cm.
Atana	(17.1 cm.)	(17.1 cm.)
Avia	(15.3 cm.)	(15.3 cm.)

In one of the males the length of the left exceeds slightly that of the right hemisphere, while in the other male the condition is reverse; in the two females the length of both hemispheres is equal.

In whites the left hemisphere is almost generally slightly longer (Eberstaller,[1] Cunningham [2]).

MAXIMUM WIDTH OF THE CEREBRUM; CEREBRAL INDEX, COMPARED TO CEPHALIC (*on the living*).

		$\left(\frac{\text{Breadth} \times 100}{\text{Length}}\right)$	$\left(\frac{\text{Breadth of Head} \times 100}{\text{Length of Head}}\right)$
Kishu	13.6 cm.	75.8	76.26
Nooktah	13.1 cm.	77.5	81.4
Atana	(12.3 cm.)	(71.9)	80.6
Avia	(11.6 cm.)	(75.8)	72.9

It can be seen that while the brains of Kishu and Nooktah have kept nearly the same relative proportions as they must have had in life, that of Atana became relatively longer and narrower and that of Avia shorter.

ARC MEASURES ALONG THE SUPERIOR BORDER [3]

a. *Anterior Point (Cunningham) to Central Fissure.*

	Left	*Right*
Kishu	17.0 cm. or 63.0 %,	17.7 cm. or 65.1% of the total mesial length.
Nooktah	16.7 cm. or 66.5 %,	16.7 cm. or 64.5 %.
Atana	(15.3 cm. or 59.8 %),	(15.0 cm. or 60.5 %).
Avia	(15.5 cm. or 64.6 %),	(15.0 cm. or 62.5 %).

[1] Eberstaller, *Das Stirnhirn*, Wien and Leipzig, 1890.

[2] Cunningham, D. J., "Contrib. to the Surface Anatomy of the Cerebral Hemispheres." *Roy. Irish Acad., Cunningham Mem.*, VII, 1892. All the following references to Cunningham relate to this work.

[3] Eberstaller measured from the anterior perforated space to the occipital pole. Cunningham, whom I follow, takes the same measures "from a point on the upper or mesial border which corresponds to the level of the outer part of the superciliary

This relative length of the precentral part to the total mesial arc, this latter being taken as 100, is termed by Cunningham the *frontal* or *fronto-Rolandic index*, and is in whites, according to the same author (pp. 55, 175), as follows:

In 12 5½ to 6½ mos. embryos	52.7
In 24 full-term fœtuses	53.5
In 82 adults	53.3
In apes and monkeys from	55.9
in chimpanzee to	45.4
in mangaby.	

b. *Central to Parieto-Occipital Fissure*

	Left	*Right*
Kishu	4.3 cm. or 15.9 %,	4.3 cm. or 15.8 % of the mesial arc.
Nooktah	3.9 cm. or 15.5 %,	5.0 cm. or 19.3 % of the mesial arc.
Atana	(5.8 cm. or 22.7 %),	(5.2 cm. or 21.0 %) of the mesial arc.
Avia	(5.1 cm. or 21.2 %),	(5.3 cm. or 22.1 %) of the mesial arc.

Cunningham, who terms the proportion of the central parieto-occipital fissure segment to the whole mesial arc (this being taken as 100, the *parietal index*), obtained the following in whites (p. 55):

	Parietal Index
In 12 5½ to 6½ mos. embryos	28.5
In 24 full-term fœtuses	25.7
In 82 adults	25.5
In 4 orangs	21.3
Further, in 4 chimpanzees	19.9
In 5 cynocephali	22.6
In 5 macaques	19.0
In 7 cebi	20.6.

margin of the frontal lobe. This border is very far from being horizontal. Its outer part is on a much higher level than the inner part. As it is traced inwards it is seen to take a sudden curve downwards towards the cribriform plate of the ethmoid bone, where it merges with the mesial border. A line drawn horizontally inwards from the high outer part of the superciliary border of the frontal lobe cuts the mesial border of the cerebrum at the point which I arbitrarily selected as the anterior end of the cerebrum. It lies, as a rule, just below the most projecting part. Behind I took the most prominent part of the occipital pole." "The first of these points may be distinguished as the *frontal point*, and the latter as the *occipital point*. Further, the distance between these two points measured along the upper border of the hemisphere may be termed the *mesial length*." (Loc. cit., pp. xi, xii.)

Cunningham's anterior point has no advantage over that of Eberstaller, and I employ it only to enable comparison of my own with Cunningham's indices.

c. *Parieto-occipital Fissure to most Prominent Point on the Occipital Pole*

	Left	*Right*
Kishu	5.7 cm. or 21.1 %,	5.2 cm. or 19.1 % of the mesial arc.
Nooktah	4.5 cm. or 17.9 %,	4.2 cm. or 16.2 % of the mesial arc.
Atana	(4.5 cm. or 17.6 %),	(4.6 cm. or 18.5 %) of the mesial arc.
Avia	(3.4 cm. or 14.2 %),	(3.7 cm. or 15.4 %) of the mesial arc.

Cunningham terms the relative distance of the parieto-occipital fissure from the most prominent point in the occipital pole the *occipital index*, and obtained for whites (pp. 55, 56):

In 12 5½–6½ mos. embryos	18.8
In 24 full-term fœtuses	20.8
In 82 adults	21.2; also, in
4 orangs	23.2
4 chimpanzees	24.2
5 cynocephali	29.7
5 macaques	31.0
7 cebi	33.0.

Among adult whites, in 45 men the occipital index was 20.8;
in 35 women the occipital index was 21.7.

The total mesial arc (from the anterior point, Cunningham, to the most prominent point on occipital pole) was:

	Left	*Right*
Kishu	27.0	27.2
Nooktah	25.1	25.9
Atana	(25.6)	(24.8)
Avia	(24.0)	(24.0).

The above indices show in the Eskimo some remarkable features which are undoubtedly more than individual variations. There are in all the Eskimo, but especially in the men, relatively high frontal and low parietal indices. The parietal indices in the two females and the occipital indices in the two males and the adult female, though also lower, approach more those in whites. There is in the four Eskimo, according to these surface measurements, relatively a more extended superior frontal and a more restricted superior parietal area than in the average whites.[1]

[1] Compare in this connection, and with the horizontal dimensions that follow, the seemingly conflicting measures of Féré, Passet, and Giacomini, referred to by Dejerine,

There is another and somewhat more accurate way in which the dimensions of the main parts of the cerebrum may be determined. If the hardened hemisphere is placed on the graduated board in such a way that the most prominent frontal and occipital points are on a line which runs lengthwise along the middle of the board, we can then secure, by means of two vertical planes and a rod-measure or an ordinary compass, any desirable horizontal distance from the cerebral extremities. Such distances, compared with the total horizontal length of the hemisphere, give indices which are somewhat more accurate and perhaps not inferior in value to those obtainable by surface measuring. Following this procedure on the Eskimo brains, I have obtained the following figures and proportions:

a. *Horizontal Length, Frontal Pole to Superior Extremity of Central Fissure*

	Left	*Right*
Kishu....	10.9 cm. or 60.6 %,	10.8 cm. or 60.4 % of the length of the hemisphere.
Nooktah..	10.9 cm. or 64.9 %,	10.7 cm. or 62.9 % of the length of the hemisphere.
Atana.....	(9.6 cm. or 56.1 %),	(10.0 cm. or 58.5 %) of the length of the hemisphere.
Avia.....	(9.8 cm. or 64.1 %),	(9.3 cm. or 60.8 %) of the length of the hemisphere.

b. *Horizontal Distance, Superior End of Central to Parieto-occipital Fissure* [2]

	Left	*Right*
Kishu....	4.1 cm. or 22.8 %,	4.0 cm. or 22.3 % of the length of the hemisphere.
Nooktah..	2.3 cm. or 13.7 %,	3.5 cm. or 20.6 % of the length of the hemisphere.

Anat. d. Centres Nerveux, Paris, 1895, p. 249. The coincidence of the relatively somewhat small occipital with relatively small parietal lobes is quite curious. Gratiolet (quoted by Cunningham, p. 59) states that in man the occipital lobe is extremely reduced; and formulates the law that "the more highly organized a member of the group is, the smaller is the relative size of the occipital lobe." Quite as striking, however, is the small relative size of the parietal lobe in the ape.

[2] The measurements are taken between the points of intersection by the fissures of the superior border of the hemisphere. Where the parieto-occipital fissure bifurcated before reaching the superior border (left in Atana, right in Avia), the measurement was taken to a prolongation of the main limb of the fissure. Same with surface measurements.

	Left	*Right*
Atana..	(5.1 cm. or 29.8 %),	(4.6 cm. or 26.9 %) of the length of the hemisphere.
Avia....	(4.0 cm. or 26.1 %),	(4.4 cm. or 28.8 %) of the length of the hemisphere.

c. *Horizontal Distance, Parieto-occipital Fissure to Occipital Pole*

	Left	*Right*
Kishu....	3.0 cm. or 16.7 %,	3.1 cm. or 17.3 % of the length of the hemisphere.
Nooktah.	3.6 cm. or 21.4 %,	2.8 cm. or 16.5 % of the length of the hemisphere.
Atana...	(2.4 cm. or 14.0 %),	(2.5 cm. or 14.6 %) of the length of the hemisphere.
Avia....	(1.5 cm. or 9.8 %),	(1.6 cm. or 10.5 %) of the length of the hemisphere.

These measurements show almost generally a higher relative proportion of the region between the central and parieto-occipital fissures than was the case with the surface measurements, which indicates that the region is relatively more flat than the others.

Two more notable facts shown by both the arc and the horizontal measurements are a very small parietal and a large occipital portion on the left in Nooktah and the small occipital portions in Avia.

A more detailed study of the figures shows that, so far as their size is concerned, the main portions of the cerebrum tend to compensate each other.

DISTANCE OF THE LOWER EXTREMITY OF THE CENTRAL FISSURE FROM THE FRONTAL POLE

Cunningham measured this distance over the surface of the frontal lobe, comparing the dimension thus obtained with the entire arc running in the same line from the mesial border of the anterior to that of the posterior extremity of the hemisphere. I have followed the same method, but have supplemented it with the horizontal distance, as with the preceding measurements. The results are as follows:

Surface Distance of the Base of the Central Fissure from the Mesial Border of the Anterior Extremity

	a. Arc to the base of central fissure.		*b*. Complete lateral arc.		Centesimal relation of *a* to *b*.	
	Left	*Right*	*Left*	*Right*	*Left*	*Right*
Kishu....	10.8 cm.	11.1 cm.	25.2 cm.	24.5 cm.	42.9	45.3
Nooktah..	10.7 cm.	10.5 cm.	23.3 cm.	23.1 cm.	45.9	45.5
Atana....	(11.2 cm.	10.6 cm.)	(22.9 cm.	23.1 cm.)	(48.9	45.9)
Avia.....	(8.0 cm.	8.6 cm.)	(21.3 cm.	21.1 cm.)	(37.6	40.8)

The centesimal relation of *a* to *b* is termed by Cunningham (p. 179) the lower Rolandic index and was:

In 17 adult whites, males	43.7
In 20 adult whites, females.....	43.0

The index differed but little in children and human embryos; in apes and monkeys it ranged (p. 175) from 39.2 in the orang and chimpanzee to 43.8 in cebus.

The *horizontal* distance of the base of the central fissure from the frontal extremity, and its centesimal relations to the length of the hemisphere, are as follows:

	a. Distance to base of central fissure.		Centesimal relation of *a* to length of hemisphere	
	Left	*Right*	*Left*	*Right*
Kishu.....	7.3 cm.	6.5 cm.	40.6	36.3
Nooktah.....	7.6 cm.	7.5 cm.	45.2	44.1
Atana.....	(8.3 cm.	7.8 cm.)	(48.5	45.3)
Avia.....	(5.4 cm.	5.9 cm.)	(35.3	38.6).

LENGTH OF THE CENTRAL FISSURE

	a. Diameter, from lower to upper extremity, taken by the sliding compass.				*b*. Length measured by a thread following all the windings of the fissure.			
			Centesimal relation of *a* to length of hemisphere.				Centesimal relation of *b* to mesial length.	
	l.	*r.*	*l.*	*r.*	*l.*	*r.*	*l.*	*r.*
Kishu.....	9.0	8.6	50.0	48.0	11.7	11.5	43.0	42.3
Nooktah....	8.0	8.4	47.6	49.4	10.7	11.0	42.6	42.5
Atana.....	(7.3	7.7)	(42.7	44.9)	(10.8	10.6)	(42.2	42.7)
Avia.....	(7.9	7.7)	(51.6	50.3)	(11.0	10.3)	(45.8	42.9)

Cunningham (p. 191), taking the length of the fissure according to *b* and comparing it with the mesial arc, obtained in whites:

In 5½ to 6½ mos. embryos	16.7
In full-term fœtuses	32.8
In 4- to 5-year-old children	33.9
In 16 adult females	40.1
In 14 adult males	38.6
and in the chimpanzee	51.1
orang	47.2
hamadryas	41.1

The length of the fissure, as seen from the above, is relatively greater in the Eskimo than in the whites; there is no decided sexual difference.

The straight length, or diameter, of the fissure can serve, in connection with the horizontal measures (from the vertical plane rising from the anterior extremity of the hemisphere to the two extremities of the fissure), in determining a Rolandic angle (by projection).

LENGTH OF THE SYLVIAN

Taking this length with a compass, from the exterior point of intersection of the Sylvian by the anterior or horizontal portion of the presylvian, to the angle which the ascending terminal branch forms with the main limb of the Sylvian, Eberstaller (quoting Cunningham) found it in whites as follows:

Up to 5.0 cm., left in 22 %, right in 45 % of hemispheres.
5.1–6.0 cm., left in 42 %, right in 44 % of hemispheres.
6.1–7.0 cm., left in 27 %, right in 11 % of hemispheres.
Over 7.0 cm., left in 9 %, right in 0.6 % of hemispheres.

These figures show that the left Sylvian is more often the longer. Cunningham (p. 122) obtained similar results, but he measured the fissure from "the point at which its trunk appears on the outer surface of the hemisphere." As this point is almost generally less clearly defined than that employed by Eberstaller,

I follow the latter authority. The Sylvians in the Eskimo measured as follows:

			Centesimal relation to the length of the hemisphere	
	Left	*Right*	*Left*	*Right*
Kishu.....	6.5	5.2	36.1	22.9
Nooktah.....	6.2	4.8	36.9	28.2
Atana.....	(6.4	5.1)	(37.4	29.8)
Avia.....	(5.4	5.9)	(35.3	38.6)

The left fissure is, in three of the Eskimo, both absolutely and relatively, decidedly longer than the right one.

Two additional useful and quite easy measures are, I think, the maximum breadth of the frontal lobes, measured by the sliding compass, with the branches applied over the most prominent points on the dorsum of the orbital parts of the inferior frontal gyri; and a diameter between the extremities of the temporal and occipital lobes. These dimensions in the Eskimo are as follows:

BREADTH OF THE FRONTAL LOBES

	Breadth	Centesimal proportion to maximum width of the cerebrum
Kishu.....	11.5 cm.	84.6
Nooktah.....	10.0 cm.	76.3
Atana.....	(7.9 cm.)	64.2
Avia.....	(7.5 cm.)	64.7

These figures demonstrate well the superiority of the frontal lobes in Kishu's cerebrum, and the inferiority in this respect to both the males of both of the females.

TEMPORO-OCCIPITAL LOBES

			Centesimal relation to the length of the hemispheres	
	Left	*Right*	*Left*	*Right*
Kishu.....	14.2 cm.	14.3 cm.	78.9	79.9
Nooktah.....	13.2 cm.	13.5 cm.	78.6	79.4
Atana.....	(13.1 cm.)	(13.4 cm.)	(76.6)	(78.4)
Avia.....	(12.0 cm.)	(11.7 cm.)	(78.4)	(76.5)

In this particular measurement the four brains show remarkable similarity.

PREVIOUS RECORDS ON ESKIMO BRAINS

The only previous records concerning Eskimo brains of which I could learn are those made by Chudzinski, published in the *Bulletin de la Société d'Anthropologie de Paris*, 1886.

The brains described by this author were those of Tobias Ignatius, male, 23 years; Paulus Abraham, male, 35 years; and Ulrika Hénocq, female, 24 years. The locality from which these subjects came is not stated, but there are reasons to believe that they belonged to the eastern Greenland Eskimo.

The three brains present some interesting similarities, but also many characteristics different from those of any of the specimens noted in this paper. In order to facilitate a comparison I shall introduce the principal part of Chudzinski's report.

The brains show "a considerable volume of the cerebral hemispheres"; "then one can see that the convolutions which constitute the external surface of the hemispheres are large, simple, and very poor in secondary divisions, and that the sinuosities are but little flexuous." "That simplicity is especially marked over the frontal lobes"; "the same lobes are at the same time flattened infero-superiorly."

"The Sylvian fissure appears to be shorter than ordinarily, nearly horizontal, and of very simple contours," except in the woman, where it is little more complex, especially on the right. "Its anterior branch is generally very short and in the brain of P. A. altogether hidden by the temporal lobe."

"The Rolandic fissure is very long." "It is flexuous, especially in P. A. Ends on mesial surface" (in all?).

"Occipital fissure very short externally. Calcarine fissure long and flexuous, especially in U. H."

"The frontal lobe is relatively short; the other lobes are, on the contrary, well developed, especially the parietal."

"The first frontal gyrus is very large, especially in Tobias, but shows only a few incisures."

"The development of the second convolution is enormous, especially in P. A." "The gyrus is very simple in Tobias." "Among other features, there is a double anastomosis with the ascending frontal."

"The third frontal gyrus is very little developed; it is short and as *ramassée sur elle même*." "In Tobias it is reduced to a small, nearly smooth isle." Better developed in U. H.

"Ascending frontal gyrus very large." "Ascending parietal gyrus very flexuous in Paulus, very large in Tobias." The two gyri (asc. frontal and asc. parietal) are slender in U. H.

"The parietal convolutions generally simple and very extended," especially the second inferior.

"Occipital lobe generally simple, especially in Tobias."

Temporal lobe: "Extreme slenderness of first convolution"; "uncommon size of second convolution."

Internal (mesial) surface: "Enormous development in breadth of the mesial part of the first frontal convolution, especially in Tobias; a division of that convolution into two secondary gyri by an uninterrupted sulcus on the left hemisphere in Paulus." The secondary sulcus seems to be continuous with the subfrontal fissure. Similar sulcus on right in Paulus, but in several places interrupted by annectent gyri.

The convolution of the corpus callosum is generally very extended; but its breadth is very remarkable in Tobias, in its posterior part, and anteriorly in Ulrika, in whom it seems to divide itself along its middle into two secondary gyri."

The ovalaire lobule is enormous in Ulrika; on the other hand, the cuneiform is small, and in Ulrika it is reduced to a "*pli de passage*," hidden, in large part, in the calcarine and occipital fissures.

The similarities in the brains reported upon by Chudzinski and the one described here consist of the large volume of the

cerebral hemispheres; long central fissures; sagittal division of the mesial parts of the superior frontal gyri; the large size of the limbic lobe in Tobias, and the large size of the lobe with a tendency toward a longitudinal division in Ulrika.

The dissimilarities are: the poor differentiation in Chudzinski's specimens of the convolutions and the simple character of the sulci, especially over the frontal lobes; a defective development of the inferior frontal convolution (particularly in Tobias); very large ascending frontal and ascending parietal convolutions; simplicity of parietal convolutions; great slenderness of the superior temporal gyri; and very small cuneus.

The causes of the many dissimilarities are not clear. The morphological inferiority of the two male brains described by Chudzinski, and, on the other hand, the marked superiority of Kishu's and even of Nooktah's brain, may be to some extent individual conditions and represent more the extremes than the average of Eskimo brains. At the same time it is possible that Paulus Abraham and Tobias Ignatius belonged to some family of the great Eskimo tribe intellectually less developed than the Smith Sound group to which Kishu and Nooktah belonged. The Smith Sound party which Lieutenant Peary brought to New York were by no means dull or incapable people. This is especially well demonstrated in Menee, the son of Kishu, who has not only shown a remarkable facility for adjusting himself in every way to civilized life, but has made very good progress in the public school.

The marked differences of the specimens described by Chudzinski and in this paper from those of the whites, as well as among themselves, makes a future acquisition of Eskimo brains very desirable.

SUMMARY OF THE ARCHEOLOGY OF SAGINAW VALLEY, MICHIGAN—II

By HARLAN I. SMITH

SAGINAW RIVER VALLEY

Bay County

Saginaw River.—The History of Saginaw County[1] states that "the water courses of the district comprise the Sac-haw-ning, or home of the Sacs. . ."

Tchigaiinibewin Village Site.—The History of Saginaw County (p. 592, ¶ 2) states that "it must also be remembered that the Great Camp, or Kepayshowink [Ka-pay-shaw-wink], of these wandering bands did not hold the same position in summer as in winter, so that he who relies upon Indian legends simply, and without further inquiry, might associate the summer camp on the lake shore with the winter camp of the interior. Both were great camps; . . . the second, or summer camp, was north of Nesh-ko-ta-younk; . . . [and] the first in coming down from the lake. In winter the Bay-shore camp was called Tchigaiinibewin by travelers as being 'close by' the great camp, and in summer a reversal of terms was simply used to denote that the upper camp was the place 'close by.'"

Nesh-ko-ta-younk Village Site.—The History of Saginaw County (p. 592) states that the "summer camp [Tchigaiinibewin], was north of Nesh-ko-ta-younk."

McCormick Mound.—W. R. McCormick,[2] referring to the Water Street mound, wrote as follows:

[1] Page 288, ¶ 2.

[2] *Hist. Sag. Co.*, p. 284, ¶ 3, second part; and ¶ 4, p. 285. McCormick, "Mounds," p. 381, ¶ 1, 2, and 3, gives the same information, with the exception

"Some thirty rods below, on Water street, between Twenty-second and Twenty-third streets, is an elevation, the highest on the river, on which is located the Bay City brewery, Barney hotel, the residence of W. R. McCormick and other residences, comprising nearly two acres. I wish to describe this elevation as I saw it, in a state of nature, over forty-five years ago. For many years it was considered to be a natural elevation of the land, but subsequent excavations have proved it to have been constructed by some remote race of people.

"When I first became acquainted with the location it was covered with a dense growth of timber, with the exception of the mound and about an acre and a half in the rear of it, *where* [from which] the earth was taken *from* to build the mound. It was then a duck pond, with water three feet deep, grown up with alder bushes. In grading Twenty-second street through the north end of *the* [this] mound, some years since, we found at a depth of 11 feet three skeletons of very large stature with large earthen pots at the head of each. In excavating for the cellar of the Bay City brewery, we found at the depth of four feet the remains of Indians in a good state of preservation, with high cheek bones and receding forehead, while, below these again, at the depth of four or five feet, the remains of a more ancient race, of an entirely different formation of skull, and with those burned stone implements and pottery were found. I have been unable to preserve any of these skulls, as they crumbled to dust when exposed to the air. I found one skeleton in a sitting position,

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of the parts here in italics and with the addition of the matter here in brackets. McCormick (W. R.), "Mounds and Mound-Builders of the Saginaw Valley." By W. R. McCormick, of Bay City. Pp. 379–383. *Pioneer Collections*, Vol. IV [1881], Lansing: W. S. George & Co., 1883. 8°.

W. R. McCormick, according to *Hist. Sag. Co.*, pp. 180–192, was born in 1822, removed from Albany, N. Y., to the present site of Flint, Genesee Co., Michigan, in 1832, later moved to Portsmouth, Bay Co., Michigan, and finally lived in Bay City. He was the first inhabitant of Saginaw valley to make any permanent archeologic records. Author of various items in *Hist. Sag. Co.*, pp. 117–120, 282–287, and 'Mounds" above noted.

facing the west, with a very narrow head, and long, as if it had been compressed. I laid it aside in hopes to preserve it, but in a few hours it had crumbled to pieces.

"This mound is full of the remains of ancient pottery and small stones that have been through the action of fire. A friend of mine found an awl made of copper which was quite soft with the exception of about an inch from the point which was so hard that a file would scarcely make an impression on it. This seems to me to show that the Mound-Builders had the art of hardening copper."

The use of the word "race" instead of "tribe" is probably a mistake in nomenclature, since the author evidently did not refer to the early European explorers or settlers. The statement that skeletons of very large size were found is probably due to misjudgment. Such remarks are commonly heard in the folklore repeated to explorers throughout the region.

It is still possible that this site is a natural hill in which were graves, and that the "duck pond" was also natural and not the source of the material of which the mound was made. Many of the hills in this region are formed by the wind and are increased and decreased by the same means. This would satisfactorily account for burials at different depths.

Fragile bones that would crumble on exposure to the direct rays of the sun, or even to dry air, may often be preserved without the use of other means than by wrapping in paper and boxing quickly so as to retain the moisture and allow them to dry slowly enough to become hard without warping.

While the narrow skull, described by Mr McCormick, may have been a case of post-mortem deformation due to pressure of the soil, it may more probably have been the skull of the rarer of two types, since not only the Sauk and Ojibwa have inhabited the region, but the Potawatomi and other tribes have visited it; and again, two forms of crania have been found elsewhere in this valley.[1]

[1] See Fobear Mound No. 1, under Saginaw County.

The statement that part of the point of the awl was so hard that a file would scarcely make an impression on it is a fallacy probably derived from the feel and effect on the file of the thickly oxidized metal as compared with that of a clean piece of metallic copper.

The term "Mound-builders," as used by Mr McCormick, probably refers to a mysterious extinct people, whereas the word "Indians" would doubtless have been more suitable in this connection.

William McCormick[1] states that "in the vicinity of the residence of William R. McCormick, that being the highest land, and where they [the Sauk] had attempted to fortify themselves; . . . at the present time, by digging in this hill, you will find it full of human bones."

Mr McCormick,[2] referring to the mounds of Saginaw valley, states that "the plow has helped to level many of them, with the exception of the Fraser, Fitzhugh, and McCormick mounds. And to prove that the last three are artificial and not natural is the fact that in the rear of all these are low places, showing where the earth had been *taken from* [procured] to build the mounds. . . .

"Again, the soil on the mounds differs from the soil around them with the exception of the low places referred to from where the earth was taken; . . . And in no part of the valley will you find those relics except in those mounds."

The description of the varieties of soil is perhaps too arbitrary, and specimens such as are found in the mounds are found also on village sites.

Professor Thomas[3] states that there is a "large artificial elevation on Water street, in Bay City, east side. . . . Described

[1] *Hist. Sag. Co.*, p. 118.

[2] *Hist. Sag. Co.*, p. 287, ¶ 1. McCormick, "Mounds," p. 383, ¶ 1–3, gives the same information with the exception of the parts here in italics and with the addition of the matter here in brackets.

[3] Thomas, *Catalogue*, p. 107.

by W. K. McCormick, in Michigan Pioneer Collection, vol. 4 (1881), p. 382."

Water Street Mounds.—W. R. McCormick[1] wrote as follows: "On the Saginaw river, toward its mouth, when we come to what is now the corner of Twenty-fourth and Water streets in Bay City, where the Center House now stands, we find the old McCormick homestead. Here were two large mounds in the garden, which my father plowed and scraped down. They contained a number of skeletons, stone axes, knives, and quite an amount of broken pottery."

Professor Thomas[2] states that "two large mounds, now gone, stood on the east side of the Saginaw River, at the corner of Twenty-fourth and Water streets, Bay City. . . Described by W. K. McCormick, in Michigan Pioneer Collection, vol. 4 (1881), p. 382."

More Mound.—W. R. McCormick[3] wrote as follows: "We will now pass over to the west side near the mill of More, Smith & Co. There was here, 45 years ago, a mound just above the mill about 100 feet across in a circular form and about three feet high. Originally it must have been much higher. I have never examined this mound, but have understood from old settlers that there were a great many stone implements found in it. The plow has nearly leveled it, so that it is scarcely noticed any more."

Professor Thomas[4] states that "there was a mound on the west side, near the mill of M. Smith & Co." as "described by W. K. McCormick, in Michigan Pioneer Collection, vol. 4 (1881), p. 382."

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[1] *Hist. Sag. Co.*, p. 284, ¶ 3, first part. McCormick, "Mounds," p. 380, ¶ 5, p. 381, first part.

[2] Thomas, *Catalogue*, p. 107.

[3] *Hist. Sag. Co.*, p. 285, ¶ 1. McCormick, "Mounds," p. 381, ¶ 4, gives the same information with the exception of the parts here in italics and with the addition of the matter here in brackets.

[4] Thomas, *Catalogue*, p. 107.

West Bay City Village Site.—On the sand ridge close to the river at West Bay City, where the railroad roundhouse is located, were found fragments of chert and burned stones in sufficient numbers to suggest that the place had been a village site.

West Bay City Graves.—In the West Bay City village site several human skeletons were dug out by the railroad section workmen, one of whom, on inquiry, reported the same. The place of these graves appeared to be a natural sand ridge in which interments had been made. This burial site may be identical with what Mr McCormick terms the Birney mound.

Birney Mound.—W. R. McCormick[1] wrote as follows: "The mound which was located near the west end of the Detroit & Bay City railroad bridge, [which] for reference I will call the Birney mound, as it is located on the lands of that great philanthropist, the late Hon. James G. Birney. This mound was not so large in circumference, but much higher than the one just noticed."[2]

"In this *were* [was] also found human bones, in a much better state of preservation than any of the rest. I procured from this mound a skull with a hole in it just above the temple bone, produced by a sharp instrument, which undoubtedly caused death. This skull I presented to J. Morgan Jennison, of Philadelphia. It was of an entirely different formation from the Indian skull of the present day, as it did not have their high cheek bones nor their receding forehead, but a very intellectually developed head, showing that it was of a different race of people from the Indian. Some years since some boys were digging in the side of the mound, as they had often done before, to get angle-worms for fishing, when they came across a small silver canoe, about five inches long. *A* [, and a] gentleman who was fishing with them,

[1] *Hist. Sag. Co.*, p. 285, ¶ 2, p. 286. McCormick, "Mounds," p. 381, ¶ 5, and p. 382, ¶ 1, gives the same information with the exception of the parts here in italics and with the addition of the matter here in brackets.

[2] Refers to the More mound "about 100 feet across . . . and about three feet high."

offered them 50 cents for it, which they accepted. After cleaning it up, he found it to be of exquisite workmanship, with the projecting ends tipped with gold. [[Query.—Was not this a present from some early Catholic missionary of whom history makes no mention?]] A rough copper kettle of peculiar shape and make, having been wrought into shape by hammering, without any seam, was also taken from one of *these* [those] mounds, and is now in the State capitol among*st Mr.* [O. A.] Jenison's [Jennison's] collections of *antiquities* [antiquity [1]]."

On August 28, 1890, Mr McCormick told the writer that the hole in the skull above mentioned may have been made as a post-mortem religious custom. Regarding the remarks concerning the shape of the skull, it must be remembered that, at the time Mr McCormick wrote, exact somatologic methods were unknown in his section, and the great difference in the shape of the skull from that of the others found (unless the skull were that of a Caucasian, possibly an early French voyageur) was probably exaggerated owing to lack of familiarity with crania. The word "race," in this connection as in others, is used indiscreetly by the author.

The silver canoe may have been introduced after the first contact with the early French traders. It suggests that the burial was comparatively recent.

The Birney mound may have been merely a natural sand ridge in which there were graves, and possibly is identical with the site of the West Bay City graves.

Professor Thomas [2] states that "a mound formerly stood near the west end of the Detroit and Bay City Railroad bridge, on land of James G. Birney. . . . Described by W. K. McCormick, in Michigan Pioneer Collection, vol. 4 (1881), p. 382."

Lynn Graves.—W. R. McCormick,[3] referring to his preceding item about the Birney mound, wrote as follows: "The next

[1] [Unfortunately the Legislature declined to purchase this valuable collection, and it has been repossessed by Mr Jenison.]

[2] Thomas, *Catalogue*, p. 107.

[3] *Hist. Sag. Co.*, p. 286, ¶ 1. McCormick, "Mounds," p. 382, ¶ 2.

mound was about half a mile up the river, and formerly stood in the center of Linn street, West Bay City, but has been graded down many years since. I was not there at the time, but was informed by others that it contained human bones and stone implements. Charles E. Jennison, a pioneer of Bay City, informs me that he dug up two skeletons many years ago in the side of this mound. He found with the skeletons two copper kettles, which he has still in his possession. I am inclined to think that these were not the remains of the original Mound-Builders, but a race of a subsequent period."

On August 28, 1890, Mr McCormick told the writer that the mound was fifty or sixty feet in diameter and twelve feet high. The copper kettles suggest that the bodies with which they were found were buried since the advent of the whites and that the site was a burial place in the sand knoll rather than a mound.

Professor Thomas [1] states that "another [referring to his preceding item about the Birney mound] stood half a mile up the river, same side [west], at what is now the centre of Lean street, west Bay City." He also mentions that copper kettles were found and that the information was derived from W. K. McCormick, in Michigan Pioneer Collection, vol. 4 (1881), p. 382.

Fitzhugh Graves.—W. R. McCormick,[2] referring to his preceding item about the Lynn graves, wrote as follows: "We now proceed a half-mile more up the river, to the rise of ground in the rear of Frank Fitzhugh's grist-mill. This elevation, 45 years ago, when I first saw it, was the most picturesque spot on *the* Saginaw river. Here was also a beautiful spring of cold water, and was a favorite camping ground of the Indians. It was also, according to the Indian tradition, the original site of the Sauk village, and where the great battle was fought when the

[1] Thomas, *Catalogue*, p. 107.

[2] *Hist. Sag. Co.*, p. 286, ¶ 2. McCormick, "Mounds," p. 382, ¶ 3 and 4, gives the same information with the exception of the parts here in italics and the addition of the matter here in brackets.

Chippewas exterminated that nation.[1] This I will call the Fitzhugh mound, as it is on the lands of Frank Fitzhugh. [¶] This elevation, comprising two or three acres, was always thought to be natural; but I am satisfied from recent excavations, and a low place to the southwest, that the earth has been taken from this point to raise the mound higher than the surrounding land, and that it is, therefore, mostly artificial. Then again, the land adjoining on the north is a yellow sand, while on the south the land fell off abruptly, and is composed of the same kind of soil as the mound, black sand and loam, from where the earth was taken. I am now speaking of this mound as it appeared 45 years ago. Since then the railroad company have excavated a part of it for ballasting *up* their road, and many other excavations and alterations have taken place, so that it has not the same appearance it had when I first saw it. Some years since Mr Fitzhugh, or the village authorities of Wenona, now West Bay City, excavated a street through this mound, which brought to light many relics, and proved beyond a doubt that this eminence was a mound built in remote ages. A great many skeletons were exhumed, together with a great many ornaments of silver, broken pottery, stone implements, etc., and, like the McCormick mound on the opposite side of the river, was full of broken stone which had been through the action of fire."

The site is probably a sand ridge, with graves in it and a natural pond near it. The ornaments of silver were doubtless the traders' ornaments commonly found in the region and suggest that the graves were made since the advent of the whites.

On August 28, 1890, Mr W. R. McCormick informed the writer that this mound was oblong and covered an acre and a half.

Mr McCormick,[2] referring to the mounds of Saginaw valley, states that "the plow has helped to level many of them, with the

[1] See footnote 2, p. 287, *American Anthropologist*, 1901.

[2] *Hist. Sag. Co.*, p. 287, ¶ 1. McCormick, "Mounds," p. 383, ¶ 1–3, gives the same information with the exception of the parts here in italics and with the addition of the matter here in brackets.

exception of the Fraser, Fitzhugh and McCormick mounds. [¶] And to prove that the last three are artificial and not natural is the fact that in the rear of all these are low places, showing where the earth had been *taken from* [procured] to build the mounds, . . . [¶] Again, the soil on the mounds differs from the soil around them with the exception of the low places referred to from where the earth was taken; . . . And in no part of the valley will you find those relics except in those mounds."

The statement regarding the varieties of soil is perhaps too arbitrary, and specimens such as are found in the mounds are found also on village sites.

Professor Thomas [1] states that there is "half a mile farther up the river, on same side, [referring to his preceding item about the Lynn graves, west side,] an artificial excavation back of Frank Fitzhugh's gristmill, now considerably disfigured. Many relics [were] found [in it]. Described by W. K. McCormick, in Michigan Pioneer Collection, vol. 4 (1881), p. 382."

Fitzhugh Village Site. — W. R. McCormick,[2] referring to his preceding item about the Lynn graves, wrote as follows: "We now proceed a half-mile more up the river, to the rise of ground in the rear of Frank Fitz-hugh's grist-mill. This elevation, *45* [forty-five] years ago, when I first saw it, was the most picturesque spot on *the* Saginaw river. Here was also a beautiful spring of cold water, and was a favorite camping ground of the Indians; it was also, according to the Indian tradition, the original site of the Sauk village, and where the great battle was fought when the Chippewas exterminated that nation.[3]

William McCormick [4] states that "the main village of the Sauks stood on the west side of the Saginaw river, just below where the residence of Mr Frank Fitzhugh now is, and opposite

[1] Thomas, *Catalogue*, p. 107.

[2] *Hist. Sag. Co.*, p. 286, ¶ 2. McCormick, "Mounds," p. 382, ¶ 3.

[3] See footnote 2, p. 287, *American Anthropologist*, 1901.

[4] *Hist. Sag. Co.*, p. 117, ¶ 3.

the mill of the Hon. N. B. Bradley." He further states[1] that on the west side of the river the main village of the Sauks was located, across the river from another village (the Portsmouth village site) "which stood near where the court-house now stands, near the ferry, in Portsmouth."

Portsmouth Village Site. — William McCormick[2] states that, across the river from the main village of the Sauk, there was "another village, which stood near where the court-house now stands, near the ferry, in Portsmouth."

West Bay City Mound.—On August 28, 1890, Mr W. R. McCormick informed the writer that on the west side of Saginaw river, near Peter Smith's mill, in the first ward of West Bay City, there was a very high sacrificial mound of conical form.

Sagenong Village Site. — William McCormick,[3] referring to Skull island, states that "just below this locality . . . lies Sag-e-nong, upon a high bank on the west side of the river. This is the Saginaw of the red man, and the only place known to him by that name. The meaning of the word is the 'land of Sauks.' The place known to the white men as Saginaw lies 12 miles or more up the river, and is called Ka-pay-shaw-wink."

Skull Island Graves. — William McCormick[4] relates that "Skull Island, which is the next island above what is now Stone's Island . . . [is] known as 'Skull Island,' from the number of skulls found on it." He further relates[5] that "about 12 miles below Saginaw City is 'Skull Island,' so named by the Indians in consideration that upon it exists an endless quantity of 'dead heads,' which were left here after a great fight, years long past, between the Chippewas and Sauks, . . . christening . . . about two acres of Bad Island." The approximate date is given:[6] "1520—Massacre of the Sauks by the Otchipwes." The writer has found no place named "Bad Island" or "Skull Island" on

[1] *Hist. Sag. Co.*, p. 118.
[2] *Ibid.*, p. 118.
[3] *Ibid.*, p. 120, ¶ 2.
[4] *Ibid.*, p. 118.
[5] *Ibid.*, p. 120, ¶ 2.
[6] *Ibid.*, p. 474.

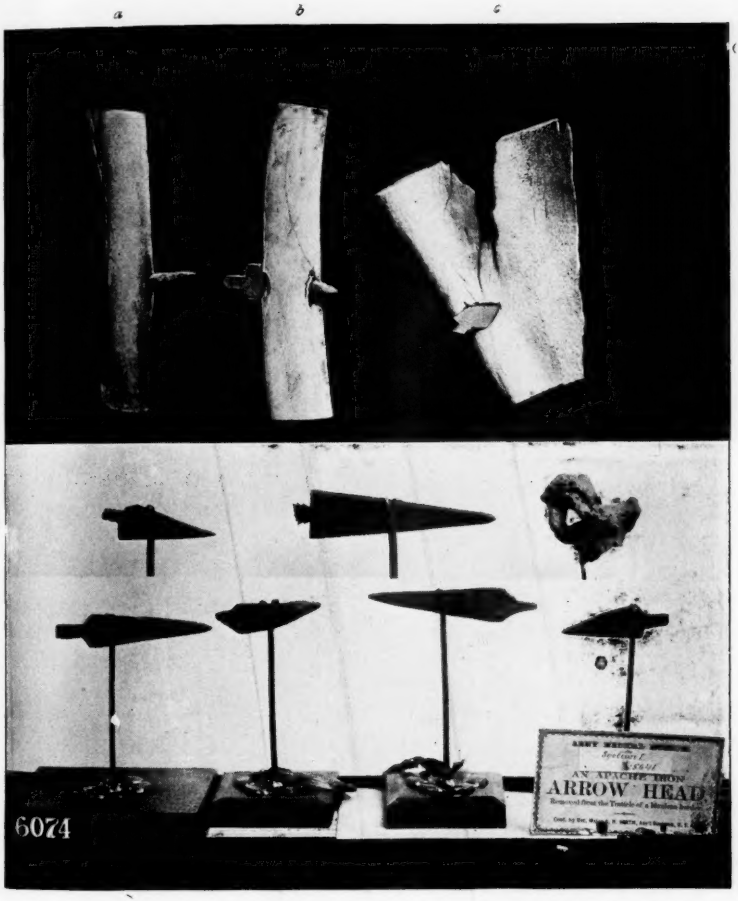
any map and suspects that the former term, at least, was used descriptively in that instance only and was perpetuated by typographic error in capitalization.

Syuaconning Creek. — The "Map of Saginaw and Tuscola, with part of Genesee, Lapeer, Huron & Midland Counties. Michigan,"[1] gives the name Syuaconning to the creek given on the map accompanying the History of Saginaw County as Syaaquanning creek. The History (p. 289) also refers to it as "Squa-hawning, or Last Battle river," and it states (p. 290) that "Squahauning creek (south branch) rises in the township of Kotchville, and flowing northeasterly enters the Saginaw river about six miles from the mouth."

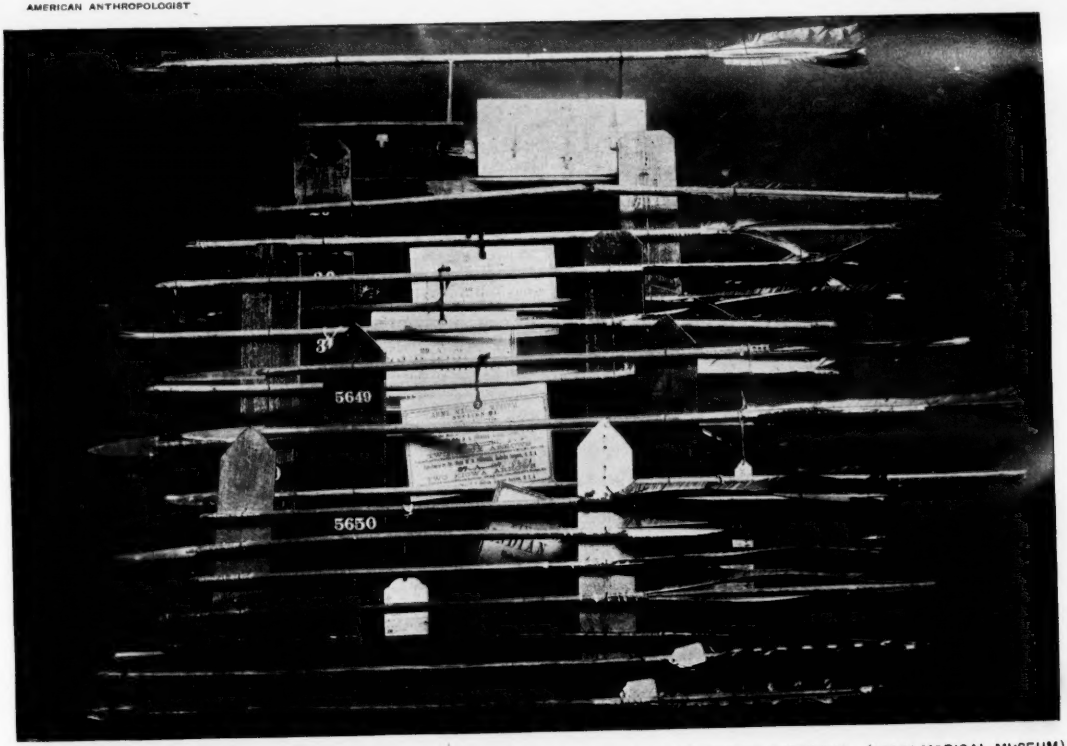
Cheboyganine Creek.—The History of Saginaw County (p. 289) gives the name of this creek as "Che-boy-gun" and states (p. 290) that "Cheboy creek rises in Tuscola county, and flowing in a northwesterly direction, through the townships of Blumfield, Buena Vista and Zilwaukee, enters the Saginaw above Bay City."

[1] Published by D. A. Pettibone. Bridgeport Center, Michigan. Lythographed printed and mounted by J. H. Colton & Co. New York. Copyrighted 1858.

ANCIENT HUMAN BONES PENETRATED BY ARROWPOINTS OR SPEARHEADS. CAVERN, KENTUCKY



a, *b*, *c*, Portions of rib and shoulder-blade of buffalo transfixed by iron arrows fired by Indians in the chase (Army Med. Mus., cat. 4735, 4736, 4737). *d*, Hoop-iron arrowhead withdrawn from brain of United States soldier nine days after being wounded in attack by Apaches.



INDIAN ARROWS USED IN ACTUAL WARFARE; MOSTLY REMOVED FROM WOUNDS BY OPERATING SURGEONS. (ARMY MEDICAL MUSEUM).

ARROW WOUNDS

By THOMAS WILSON

Baron Percy, the author of the *Manuel du Chirurgien d'Armée*, declared that military surgery had its origin in the treatment of wounds inflicted by arrows and spears, and in proof thereof he quoted from ancient classics[1] and cited Chiron's and Machaon's patients, Menelaus and Philoctetes, and Eurypyles treated by Patroclus. He believed the name "medicus" in the Greek anciently signified "sagitta," an arrow,[2] and declared that Hippocrates used a particular forceps, "belulcum," for extracting arrows, which his successor, Diocles, improved and called "graphiscos."[3] Heras of Cappadocia, in the wars of Augustus, invented the duck-bill forceps. Celsus[4] taught the necessity of dilating the wound in order to extract the arrowpoint, and Paulus Ægineta[5] treated arrow wounds in a peculiarly successful manner.

Baron Percy, who thus showed his knowledge of classic medical literature, supposed he had discovered the origin of surgery and was dealing with the earliest wounds made by man with the machinery of war; but the scientific discovery, during the nineteenth century, of prehistoric man, and the repeated findings of graves and cemeteries belonging to the Neolithic and Bronze ages, with their thousands of skeletons—many of them with wounds and fractures—have completely overturned Baron Percy's theory regarding the earliest human wounds and the origin of surgery.

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[1] Homer, *Iliad*, book XI.
[2] Sextus, *Advers. Math.*, book I, chap. 2.
[3] *Andrea della Croce*, book VII, p. 173.
[4] *De Medicina*, book VII, chap. 5.
[5] *De re Medica*, book VI, chap. 88.

We know how the ages of Stone and Bronze had passed away prior to the beginning of history, and how the world was left without knowledge of their existence. Arrowpoints of stone were used by thousands in times of antiquity, but those known to the history of civilization were of iron or bronze; none were of stone. In the army of Xerxes only one tribe—blacks from the interior of Africa—had arrows tipped with stone; the age of stone arrowpoints or spearheads had passed away before the time of Xerxes. All this shows how mistaken was the author of the *Manuel du Chirurgien d'Armée* in his opinion concerning the origin of surgery and the dates of the earliest wounds made by man's weapons.

It has been thought by many persons, among them those qualified to judge, that no burials were made during the Paleolithic period in western Europe. Whether this be true or not it must be admitted that, because of the rarity of the burials or the length of time which has elapsed,—or possibly because of the failure to discover the graves,—comparatively few osseous remains of Paleolithic man have been found. This would satisfactorily account for the few evidences of wounds that have been observed.

The skeletons from the cave at Cro-Magnon show indications of wounds. The femur of the man has been broken, while the forehead of the woman who lay beside him bears a large gash, made apparently with a hatchet. Broca,[1] who examined these specimens, is of opinion that the latter bore traces of suppuration and evidences of healing. Dr Hamy reports many of the bones in the cavern at Sordes as having curious wounds—one a gaping wound in the right parietal of a woman who, like the one of Cro-Magnon, must have survived the injury for some time. Pieces of bone had been removed and there was evidence of healing.[2]

Whether these caves and the burials found therein belonged

[1] *Les Ossements des Eyzies*, Paris, 1868.

[2] Lartet and Chaplain-Duparc, *Une Sepulture des Anciens Troglodytes des Pyrenées.*

to the Paleolithic period may be left undetermined so far as concerns the present investigation; but we will see that in the Neolithic period such wounds, made sometimes by hatchets or by blows from other weapons, and sometimes by thrusts received from arrows or spears, were found in considerable number.

The late Dr Prunières, of Marvajols (Lozère), France, surgeon, anatomist, and early student of prehistoric archeology, conducted many original excavations into the dolmens, tumuli, and burial-places of his neighborhood, and before his death possessed a large collection of objects pertaining to prehistoric man in that section. He took special care to search for and to preserve all specimens relating to physical anthropology, especially those showing skeletal peculiarities. The following is a partial list of objects in his collection relating to arrow wounds:

The superior portion of a tibia, with a deep and suppurated wound, in which is still embedded a flint arrowpoint.

Fragment of the iliac bone, in the internal part of which is embedded an arrowpoint of flint in a wound which shows signs of suppuration.

Another fragment of iliac bone, in the external part of which was embedded an arrowpoint of flint in a suppurated wound.

A dorsal vertebra with a flint arrowpoint in a wound in the body of the vertebra—no suppuration.

Lumbar vertebra with a wound which has been much enlarged by suppuration and having an arrowpoint embedded in it.

A vertebra with an arrowpoint buried in the body.

A vertebra with an arrowpoint buried in the wound.

An astragalus with an arrowpoint in the wound.

The caverns of Baumes-Chaudes and L'Homme Mort were charnel-houses of Neolithic times, each containing about three hundred skeletons capable of identification. It was out of this wealth of material that Dr Prunières was able to obtain such a large number of peculiar specimens.

The anthropologists of France have always realized the importance of examining and preserving early pathologic or traumatic specimens, and many, especially De Mortillet, Cartailhac,

Nadaillac, de Baye, Hamy, and Capitan, have reported specimens bearing evidence of arrow wounds.

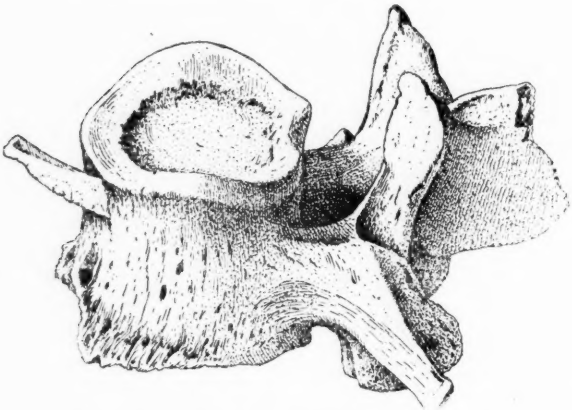

FIG. 59—Prehistoric human vertebra pierced by flint arrowpoint. (Cartailhac, *La France Préhistorique*, p. 254, fig. 124.)

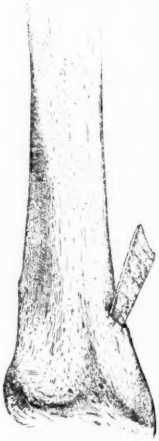

FIG. 60—Prehistoric human tibia pierced by flintarrowpoint. France.

Fig. 59 represents a human vertebra pierced by an arrowpoint, *tranchant transversal*, from the cavern of Pierre-Michelot (Marne), collected by Baron de Baye. Fig. 60 illustrates a human tibia penetrated by an arrowpoint, found in the dolmen of Font Rial near Saint Affrique (Aveyron). Next to Dr Prunières, Baron de Baye has been one of the most successful seekers for such specimens. In the cavern of Villevenard he found one skull containing three *tranchant transversal* arrowpoints, while another was lodged between the dorsal vertebræ. Other human vertebræ pierced with flint arrowpoints were found in the caves of Petit-Morin. In one sepulchral cavern the Baron found seventy-three flint arrowpoints, and, as in the case of Villevenard, their position was such as to lead to the supposition that they had been embed in the flesh at the time of interment and had fallen down as decomposition progressed. A human vertebra was found by M. Cartailhac in the covered way of Castellet, near Arles, with a stone arrowpoint incrusted therein. The absence of any exostosis shows that death quickly followed.

Another human vertebra pierced by an arrowpoint, which appears to have passed entirely through the body, was found in the cavern of La Tourasse near Saint-Martory, Haute Garonne, and has been described by M. Émile Cartailhac.[1] The archeological museum of the Jardin des Plantes, under Dr E. Hamy, contains a number of specimens of human and animal bones penetrated by arrowpoints. By noting the prehistoric specimens alone, the list might be considerably enlarged; but enough has been presented to show the general use of arrows and spears in deadly contests during prehistoric times.

The skull of an ancient Indian man of advanced age, originally received by the Smithsonian Institution from Dr C. Yates, of Alameda county, California, and transferred to the Army Medical Museum, exhibits a wound made by a long flint arrowpoint which penetrated the left orbit (fig. 61). The arrowpoint illustrated belongs to the class usually called perforators, or drills, but in this instance it was used as an arrowpoint.

FIG. 61—Ancient skull pierced by a flint arrowpoint (perforator). California. (Army Med. Mus., cat. 5531.)

FIG. 62—Ancient human vertebra pierced by a quartz arrowpoint; healed. (Army Med. Mus., cat. 5553.)

Fig. 62 also shows a prehistoric specimen unearthed in 1869 from an Indian mound in the vicinity of Fort Wadsworth, Dakota, by Surgeon A. T. Comfort, U. S. A. It consists of a human lumbar vertebra with a small arrowpoint of white quartz

[1] *L'Anthropologie*, VII, p. 3, 1896.

incrusted in it. The vertebra is covered with a new bony formation, showing that the wounded man survived the injury for some months at least.

An ancient aboriginal skull from Henderson county, Illinois, contributed to the National Museum by M. Tandy, is shown in fig. 63. It had a hole in the squamosal bone on the left side, inserted in which, when found and received by the museum, was a stone arrowpoint also of the perforator or drill type.

FIG. 63—Ancient skull pierced by perforator arrowpoint. Illinois. (U. S. Nat. Mus., cat. 60281, 60282.)

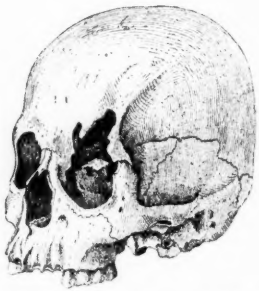

FIG. 64—Arrow wound over left orbit of ancient skull; entirely healed. Missouri. (U. S. Nat. Mus., cat. 173995.)

A human skull from a mound in Missouri is represented in fig. 64. The subject had received a serious wound in the left supraorbital arch, which involved the bones of the interior arch, causing it to break down; but the wound had entirely healed, the cicatrization was complete, and all the wasted or destroyed pieces of bone around the wound had sloughed off and reparation of the edges had taken place. Of course the missile which penetrated the skull did not remain in the wound, and was not found, but from its superficial smallness and its depth there is no doubt that the wound was made by an arrowpoint.

Two specimens of prehistoric flint arrowpoints or spearheads found inserted in human bones are represented in plate XVII. These specimens were sent to the National Museum by Dr John E. Younglove, of Bowling Green, Kentucky. No. 1 shows an

implement 3½ inches long, 1⅜ inch wide, and ¼ of an inch thick. The stem is broken, which shortens it considerably. It had pierced the pelvic bone. No. 2 is 4 inches long, 1⅜ inch wide, and ¼ of an inch thick, and is inserted in the head of a human femur (?). No. 1 is loose, so that it may readily be taken out of its present socket; but No. 2 is firmly embedded. The material of both points is the black or brown lusterless pyromachic flint common to the country in which it was found. The specimens came from a cavern about four miles northeast of Bowling Green, and an equal distance from Old Station. The opening of the cave was about 3 feet in diameter and the hole about 40 feet in depth. At its bottom the cave extended horizontally several hundred feet through apparently solid rock.

Most of the specimens of arrows and arrow wounds in the Army Medical Museum pertain to modern Indian warfare. The arrowpoints of iron or steel show, by actual experience and ocular demonstration, the effect of these projectiles upon bones, the endurance of the patient, and the skill of the surgeon; consequently they are of considerable interest. They also show that none of the arrowpoints were poisoned.

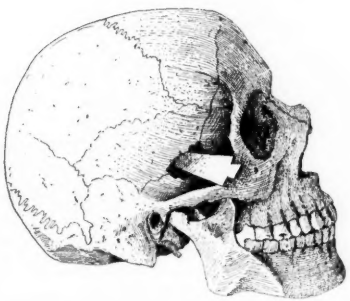

FIG. 65—Skull of a white man pierced by arrowpoint in Indian fight near Pecos river, Texas, 1870. (Army Med. Mus., cat. 5907.)

Fig. 65 illustrates an arrow wound which was treated by W. M. Notson, Assistant Surgeon, U. S. A. An attack was made by Indians near Pecos river, Texas, September 1, 1870, in which one man was killed, one escaped, and the patient received an arrow wound in the head and three gunshot flesh-wounds. Seven days later he was admitted to the hospital at Fort Concho, Texas, having traveled part of the distance on foot. He complained of

soreness from the gunshot wounds, but spoke lightly of the "scratch" made by the arrow on the side of his head. The gunshot wounds healed, but cerebral complications developed. An effort was made to reopen the wound in the temple, which proved unsuccessful on account of the resistance of the temporal facia, and doubt as to the cause of the existing symptoms prevented the surgeon from making a free incision. The case terminated fatally September 19, and the autopsy revealed the real injury to have been caused by the entry of the iron arrowhead half an inch from the external incision.

Fig. 66 represents the case of Martin W——, of Co. E, 4th Cavalry. He was on duty as one of the mail-stage guards from

FIG. 66—Skull of United States cavalryman pierced by iron arrowhead by band of Comanche, near Fort Concho, Texas. (Army Med. Mus., cat. 5908.)

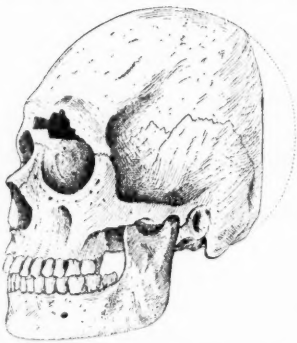

FIG. 67—Skull of a Mexican killed in Indian fight 75 miles northwest of Fort Concho, Texas, 1868. (Army Med. Mus., cat. 5644.)

Fort Chadbourne. About twenty miles from Fort Concho, Texas, the stage was attacked by a band of Comanche. This soldier was wounded by an iron-headed arrow, which entered the squamous portion of the left temporal bone and penetrated the left cerebral hemisphere to the depth of an inch or more, causing intracranial bleeding, which was speedily fatal. The puncture of the thin calvaria without fissuring is well indicated; internally there is no splintering. The vitreous table is as cleanly divided as is the outer table.

Fig. 67 represents the skull of a Mexican killed by an arrow in an Indian fight seventy-five miles northwest of Fort Concho, Texas, February 22, 1868. He was treated by W. M. Notson, Assistant Surgeon, U. S. A., who reported:

> When I opened the skull I found an incision extending clear across the opposite hemisphere, touching the dura mater just above the tentorium. The dura mater was stained, but I could find no mark on the skull. When I made the post mortem I found the arrowhead in the brain. When the patient was hit, he seized the arrowshaft with both hands and pulled it out, then dropped and remained unconscious until he died, about six hours after.

Private John Krumholz, Co. H, 22d Infantry, was wounded at Fort Sully, South Dakota, June 3, 1869, by an arrow which entering at the outer canthus of the left eye, penetrated the skull two inches, and is supposed to have passed between the skull and the dura mater. The operation for extraction, which was immediately performed, consisted in sawing nearly through the skull with a Hey's saw, in close proximity to the arrow. Recovery was rapid, the soldier returning to duty June 7 (?).

The iron arrowpoint shown in plate XVIII, *d*, represents a very interesting case. Private Snowden, 14th Infantry, was one of a party surprised by Apaches, March 22, 1866, while en route from Maricopa Wells to Fort Goodwin, Arizona. He was struck in the back of the head by an arrow, which penetrated the skull, and nine days later reached Maricopa Wells, weak and fatigued, but unimpaired in intelligence. He believed the arrowpoint to be within the cranium, since, in pulling on the shaft after receiving the injury, nothing but the shaft responded. The usual treatment was being given with success, when in examining the scalp there was discovered a small tumefaction over the parietal side of the left occipito-parietal suture. Pressure caused the issue of a small quantity of serous matter from the cicatrix of the arrow wound. This was enlarged, and a probe passed into it was made to feel along the fissure in the bone, when it struck something

metallic. The cranium was laid bare by a crucial incision, and with considerable difficulty a hoop-iron arrowhead 1¾ inch long and ½ inch in breadth was withdrawn from the brain. About a dram of pus followed it. After the operation the right side of the body was observed to be paralyzed. The patient's condition fluctuated, but the first week in May his improvement had been such as to cause belief in his ultimate recovery. On the 7th he ate something which disagreed with him and gradually grew worse until the morning of the 13th when death ensued. The post mortem showed that the brain tissue to the extent of three-fourths of an inch around the track of the arrowpoint was softened and disorganized.

Private William Drum, 14th Infantry, was wounded in a fight with Apaches, November 11, 1867. One arrow entered over the malar bone of the left side of the face, and passed along the lower border of the orbit to within half an inch of the nose. Another arrow entered through the tendons of the latissimus dorsi muscle on the right side and passed directly backward toward the spine under the deep muscles, penetrating 2½ inches. On the 19th the arrowpoint was cut out, the parts healed by first intention, and on December 3 the patient was returned to duty.

John Fenske, a civilian, aged 19 years, came to Fort Ridgely, Minnesota, on the night of August 20, 1862. He had been wounded on the previous day by an Indian arrow, shot from a distance of about twelve feet, which had entered horizontally between the third and fourth ribs on the left side, close to the vertebræ. The arrow—a barbed one with a head about three inches long—was buried an inch below the surface of the skin and had penetrated the left lung. On account of the barbs, it became necessary to make a large perpendicular incision in order to remove the arrowhead, which required considerable pulling, the sharp edges having been wedged in between the ribs with such force as to bend them over on each side. After dressing and the usual treatment, a healthy suppuration ensued, and the wound

closed by granulation in thirteen days. The surgeon reported that "it was evident in this case that the arrow had penetrated the lung," which diagnosis was fully corroborated by the objective as well as the subjective symptoms. The patient left the hospital for his home, September 30, 1862, forty-two days after receiving the injury. The surgeon met this patient four years after and found the pleural symptoms considerably ameliorated.

Private Hardwick, 14th Infantry, was wounded in an engagement with Indians near Bower's ranch, Arizona, November 11, 1867. One arrow penetrated the rectus femoris muscle at the center and passed upward and inward to the bone; another arrow entered the center of the belly of the biceps cruris muscle and penetrated to the bone. The surgeon operated upon him on the field, enlarged the wound of the thigh, and removed the arrow. The patient was sent to Camp Whipple; on December 15 both wounds had healed, on the 28th he was able to walk on crutches, and in January he returned to duty.

Surgeon J. H. Bill[1] remarks on the rapidity with which the American Indians discharge their arrows, stating that an individual receiving one wound is almost sure to receive others, and the records of the surgeons tend to substantiate his assertion. Private Imbler, 31st Infantry, while within a few hundred yards from camp at Fort Stevenson, Dakota, October 10, 1867, received three severe wounds from Indian arrows. One of the arrowpoints entered above the left scapula, transfixed the left posterior triangle of the neck, and was extracted at the angle of the jaw; a second passed through the fleshy portion of the right forearm; a third pierced the ulnar side of the left forearm near the elbow. The last was the most serious wound; the distorted head of the arrow was extracted near the wrist, and, save for partial paralysis of the left hand, the patient speedily recovered.

Private Nix, 14th Infantry, was wounded near Camp Lincoln, Arizona, in October, 1868. He received a gunshot flesh-wound in

[1] *American Journal of Medical Sciences*, XLIV, p. 365.

the upper portion of the left arm, a cut from an arrow in the left ear, two flesh wounds from arrows (from which the hemorrhage was profuse), two arrow wounds in the right knee, one gunshot wound in the right elbow and another through the right hand. He was conveyed to camp, riding part of the time on a horse with a comrade, during which time, eight hours, he became very weak from loss of blood and died the next morning.

Nat Crabtree, a citizen of Montana, while searching for cattle, April 24, 1868, received nine arrow wounds. He was conveyed to Camp Cook. Some of the arrows had been removed by his friends, but five, one of which had penetrated 10½ inches, were taken out at the post. The man died a few hours after admission.

A remarkable case of arrow wounds was that of Private Osborn, 2d Nebraska Cavalry, wounded in a skirmish with Indians near Pawnee Reserve, Nebraska, June 23, 1863. Eight arrows entered different parts of his body, and all were extracted except the head of one which had entered at the outer and lower margin of the right scapula and passed upward and inward through the upper lobe of the right lung or trachea. The hemorrhage was so severe that all hope of his recovery was abandoned. The patient, however, rallied, but continued to suffer great pain on swallowing or coughing, and occasionally spat blood. In July, 1866, more than three years afterward, he called upon Dr J. H. Peabody to be examined for a pension. Upon probing through a small fistulous opening just above the superior end of the sternum, the point of the arrow was found resting against the bone about an inch and a half below, the head lying flat against the trachea and esophagus, with the carotid artery, jugular vein, and nerves overlying it. After some difficulty the point of the arrow was raised above the sternum and it was extracted without the loss of an ounce of blood, the edge grating against the sheath of the innominata artery during the operation. His health underwent a remarkable improvement, and the operator, in January, 1869, reported him perfectly well. His pension was not allowed.

Private Spillman, 7th Cavalry, was wounded June 12, 1867, about a mile from Fort Dodge, Kansas, by a party of Kiowa who made a dash upon the herd of horses he was guarding. He received three arrow wounds—one in the right shoulder; one in the right side, striking the rib; and a third through the right lumbar region, penetrating the abdominal cavity eight inches or more. The last-mentioned wound was enlarged, two fingers were inserted on each side of the shaft until the base of the iron head was reached, the fingers serving as a guide and protection when, traction being made, the arrow was withdrawn. The wound proved mortal.

Private Livingston, 3d Cavalry, was wounded, October 6, 1866, at Fort Stevens, Colorado. An arrow entered the right side of the thorax between the first and second ribs. He pulled it out immediately, stating that a great gush of blood followed. He was conveyed in an ambulance over a rough mountain road to Fort Garland, Colorado, where he arrived on the 12th in a weak condition and suffering from dyspnœa. He was successfully treated and returned to duty in the following February.

In February, 1868, an arrow with an iron head, shot by a Dakota Indian, entered the body of John Locke, sutler's employee, three inches to the right of the fifth lumbar vertebra. The arrowpoint came out two inches below the ensiform cartilage. The arrowshaft was withdrawn by cutting it in two and drawing the anterior half out of the anterior opening, the posterior half out of the posterior opening. The patient lost about eight ounces of blood at the time, and a small quantity internally during the evening following the injury; he was confined to bed about two weeks, had much irritative fever and circumscribed peritonitis. Four weeks afterward he was walking about, and was able to attend to his duties by July 1. He was attended by Surgeon C. E. Goddard, of Fort Rice, Dakota.

The records made by army surgeons, as well as specimens exhibiting arrow wounds in the Army Medical Museum, testify

to the wonderful endurance of the subjects, and combine surgical interest with the long story of Indian warfare.

To-Kah K-ten, or "He-that-kills-his-enemy," an Indian scout at Fort Buford, Dakota, received, January 3, 1870, an arrow-wound in the pelvis and abdomen. The projectile entered from behind and ranged upward; the shaft, which penetrated twelve inches, was pulled out by the patient, but the head, which penetrated three inches deeper, remained in the wound. The case received surgical treatment and progressed favorably until peritonitis supervened, and death ensued on January 18.

Corporal Monaghan, Co. C, 31st Infantry, was wounded in an Indian skirmish near Fort Buford, Dakota, November 6, 1867, by an arrow which entered below the inferior angle of the right scapula, and, passing around the ribs, came to the front. He walked two miles to the hospital with the arrow sticking in him. An incision was made and the arrowpoint extracted two inches above and a little to the outside of the right nipple, while the shaft was drawn back and removed through the wound of entrance. By November 26 both wounds had healed and the patient returned to duty.

Fig. 68 represents an interesting case of arrow wound, the history of which is as follows:

Satamore (Set-emâ'-i), a wild Indian, chief of the Kiowa, in 1862 led his tribe in war against the Pawnee, and engaged in a fight with them near Fort Larned, Kansas. He was on horseback, and coming to close quarters, threw himself to the opposite side of his horse after the manner of Indians. A Pawnee on foot, and within a few paces, fired from behind an arrow which, just missing the horse's backbone, entered the Indian's buttock. The shaft was withdrawn, leaving the iron arrowpoint in his body. He passed bloody urine, but the wound soon healed, and in a few weeks he was able to go on the hunt for buffalo without inconvenience. For more than six years he continued at the head of his band, leading it in all its travels and adventures or

the chase. The presence of the arrowpoint troubling him, in August, 1869, he applied to Assistant-Surgeon W. H. Forwood,

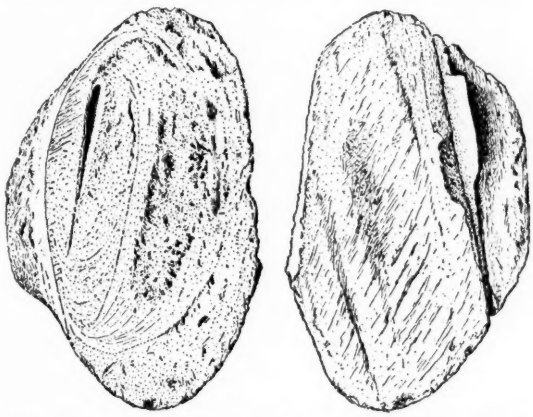

FIG. 68—Calculus containing iron arrowhead, taken from bladder of the Indian chief "Satamore," seven years after wound. Natural size. (Army Med. Mus., cat. 5931.)

U. S. A., at Fort Sill, and revealed what to the Indian was regarded as a deep secret. A surgical examination revealed a vesical calculus. The operation of lithotomy was performed with the assistance of Assistant-Surgeon Kilbourne, U. S. A., the calculus was removed, and on being sawed in two revealed the presence of the arrowpoint as its nucleus. The figure shows the calculus with the arrowpoint still in it. Its weight was eight hundred and fifteen grains and consisted of an almost uniform deposit of triple phosphates.

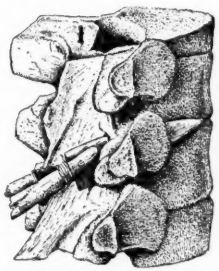

FIG. 69—Human vertebræ containing iron arrowhead. Subject killed in Indian fight near Fort Concho, Texas, 1869. (Army Med. Mus., cat. 5673.)

Fig. 69 shows an iron arrowpoint impacted in the right transverse process of the fourth dorsal vertebra and posterior extremity of the rib. It was taken from the body of a white man who was

killed by Indians, in 1869, near Fort Concho, Texas. The post mortem developed not fewer than four arrowpoints in his lungs and heart.

Fig. 70 represents the point of an iron, or apparently steel, arrow- or knife-point which has been shot or thrust into the thoracic vertebra, passing directly into the spinal cord, producing instant death.

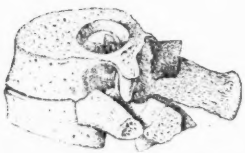

Fig. 70—Thoracic vertebra with iron arrow- or knife-point passed directly into spinal cord, resulting in instant death. (Army Med. Mus., cat. 9246.)

Fig. 71 shows a specimen of buffalo-rib with a transfixed arrowpoint and the broken arrowshaft by its side. The penetration and binding of the arrowpoint emphasize the force with which it was shot from the bow.

Many stories are told in regard to the force of arrows shot by Indian bowmen. It is said that an arrow has been driven through a buffalo or horse when not intercepted by a bone. A specimen is reported in the Army Medical Museum with the arrowpoint transfixed in the scapula, *from the interior;* that is, after having passed through the body of the animal.

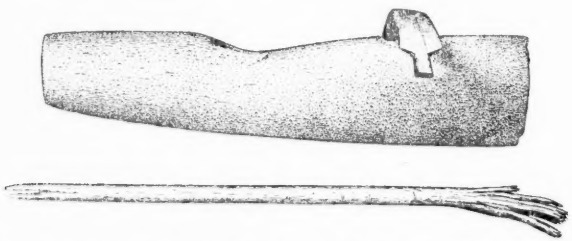

FIG. 71—Buffalo rib with transfixed iron arrowhead; broken arrowshaft by its side. (Army Med. Mus., cat. 7088.)

Plate XVIII, *a*, *b*, *c*, represents portions of the rib and shoulder-blade of buffalo which have been transfixed by arrows fired by Indians in the chase. They were obtained by Prof. Joseph Henry of the Smithsonian Institution, and deposited in the Army Medi-

cal Museum. The iron arrowpoints are still in the wounds. The specimens are introduced to illustrate the force with which an arrow can be shot by the bow, and, because of its initial velocity, there is no comminution of the bones. The edges around the wounds are not fractured or fissured on either side; there are n splinters made by the arrow on entering or leaving. This is due to the same principle that a pistol ball fired at short range passes through a pane of glass without shattering it.

A paper by W. Thornton Parker, M.D.,[1] describes the arrow and its mode of manufacture, and magnifies the malignity of arrow wounds. The author explains the apocryphal difference between hunting and war arrows, saying:

> The head of the war arrow is shorter and broader than that of the hunting arrow, and is attached to the shaft at right angles with the slot which fits the bow-string, the object being to allow the arrow in flight more readily to pass between the human ribs, while the head of the hunting arrow, which is long and narrow, is attached perpendicularly to the slot, to allow it to pass readily between the ribs of the running buffalo.

Ashhurst[2] wrote an extensive article on arrow wounds. He takes a favorable view of the curability of arrow wounds, which is borne out by the cases cited, and says:

> Those penetrating the chest and wounding the lung, although serious, are by no means mortal. . . . If the patient survives the hemorrhage, the prognosis is favorable, for the consecutive inflammation is usually trifling and requires no treatment beyond placing the patient at rest and affording a supply of pure warm air.

His table of arrow wounds in the chest shows that out of eighteen cases there were thirteen deaths.

Dr Kilbourne,[3] in an address delivered before the Buffalo Medical Club in 1881, tells of a prominent U. S. Army officer who,

[1] *Medical Times*, Nov. 17, 1883, XIV, pp. 127–129.
[2] *International Encyclopædia of Surgery*, II, p. 116.
[3] *Buffalo Medical and Surgical Journal*, XX, pp. 538–544.

while a subaltern, received a wound from a Comanche arrow. He remarks:

> The weapon pierced the upper part of the right chest and passed nearly horizontally through the lung, the point protruding at the back between the scapula and the spine. He informed me that, at his own request, a silk handkerchief was fastened to the shaft, which was then pushed through his body, dragging the silk after it through the whole extent of the wound. He recovered and served actively in the army for many years after.

Eighty-three cases of arrow wounds, of which twenty-six proved fatal, are reported by the Surgeon-General,[1] U. S. A. Nearly all the fatal cases involved wounds in the three great cavities or in the larger bones or joints.

Plate XIX represents a number of arrows used by Indians in actual warfare. Most of them were removed from wounds by the operating surgeon.

Dr W. Thornton Parker[2] tells of a case of arrow wound under his own (temporary) treatment:

> While passing through the little town of Trinidad, New Mexico [now Colorado], some years ago, I was called to see a man who had received a severe and apparently desperate arrow-wound through the right chest in a skirmish with Indians the day before. The arrow had penetrated quite through the right lung. The head had been detached and the shaft withdrawn. Some hemorrhage had followed, but he had recovered from the shock. I ordered cold water compresses and left Dover's powders with wine for convalescence. Some months after I met the patient in robust health driving a four-horse Rocky Mountain stage with only external marks of his wound remaining. His recovery had been rapid and regular. His lungs appeared sound, judging from the use he was able to make of them in shouting and halloaing.

Surgeon J. H. Bill,[3] U. S. A., describes the apparatus devised by himself and in use by other surgeons for the extraction of arrows. It will be needless to follow these in their details, but the

[1] Circular No. 3, August 17, 1891.

[2] *Philadelphia Medical Times*, Nov. 17, 1883, XIV, pp. 127–129.

[3] *American Journal of Medical Sciences*, N. S., XLIV, p. 365.

principle is that, using the arrowshaft as a guide by which to find the arrowhead, it shall be snared or seized in some way with a wire or loop or similar device by which the traction can be applied to the arrowpoint, when it, with the shaft attached, can be withdrawn.

Dr W. Thornton Parker [1] described the Indian method of removing arrowpoints when imbedded in the wound. He says a willow stick is split, the pith scraped out, and the ends rounded so that they may readily follow the arrow track. The pieces are introduced so as to reach and cover the barbs; they are then adjusted, bound to the arrowshaft, and all withdrawn together.

This brief account of arrow wounds does not pretend to be complete, nor to treat the subject from a surgical or scientific point of view. Those who desire to continue it, either scientifically or historically, may consult the following authorities in addition to those already cited:

Dr Gross. *A System of Surgery*, 4th ed., Philadelphia, 1866, I, p. 361.

Surgeon B. A. Clements, in Hamilton's *Military Surgery*.

Surgeon J. H. Bill, in *American Journal of Medical Sciences*, N. S., XLIV, p. 365.

Assistant Surgeon Elliott Coues, in *The Medical and Surgical Reporter*, 1866, XIV, p. 321.

Prof. C. A. Pope, in *St. Louis Medical and Surgical Journal*, January, 1864.

[1] *Medical Times*, op. cit., Nov. 17, 1883, XIV, pp. 127–129.

MEXICAN CODICES: A LIST OF RECENT REPRODUCTIONS

By M. H. SAVILLE

One of the most important sources of information for the study of ancient Mexico is found in the existing pictorial and hieroglyphic codices, or books. As is well known, several of the tribes of Mexico had attained a degree of culture at the time of the Spanish conquest that led to the recording of events of national importance and much that related to their religion, not only on stone bas-reliefs and sculptures, but on material of a more perishable nature.

They made books, which have been generally called codices, on strips of deerskin, the surface of which was covered with a thin coating of stucco. These were folded screen-fashion, and the paintings were on both sides. They had furthermore invented a kind of paper. In Yucatan and the Maya territory this paper was made from the membrane of a tree, and I am tempted to quote from Peter Martyr the description he gives of the books which were seen by him, and of the way in which they were made. He says:

"They do not bind their books as we do, leaf by leaf, but they extend one single leaf to the length of several cubits, after having pasted a certain number of square leaves one to the other with a bitumen so adhesive that the whole seems to have passed through the hands of the most skilful bookbinder. Whichever way this book was opened, it would always present two sides written and two pages appear, and as many folds, unless you extend the whole of it. . . . The leaves of these books upon which they write are made of the *membrane* of trees, from the substance that grows beneath the upper bark, and which they say is very scarce. It is not like that found in the willows or elms, but such as is found inside of certain edible palm trees, and which, re-

sembling coarse cloth, grows between the intersecting leaves precisely like network. These porous membranes they fill up with bitumen and render them pliable and stretch to whatever form they please, and being made hard again they cover them with a certain kind of *gypsum*."

In Mexico proper, in addition to bark-paper, a paper was made from the leaves of the maguey plant, *Agave Americana*. This paper they also sized with a thin coating of lime. One of the things which impressed Cortés, when he first came in contact with the messengers sent out by Montezuma, was that some of them were busily employed in making paintings of the Spaniards, their costumes, arms, and the different objects of interest, giving to each its appropriate color. These were to convey to Montezuma an idea of the conquerors in picture-writing, and is the first notice we have of its existence in ancient America.

Unfortunately, after the conquest the misdirected zeal of the missionaries resulted in the destruction by fire of the greater number of these old books in order to alienate the natives from their superstitions and beliefs in their pagan gods. In Yucatan nearly one hundred Maya books were burned at Mani by order of Bishop Landa, while in Mexico the treasures of Texcoco, the chief seat of ancient learning in the valley of Mexico, were ruthlessly destroyed by order of Zumarraga, the archbishop.

Shortly after this, however, we learn that on two different occasions the oldest Indians and those understanding most concerning the ancient things were brought together and represented in paintings these things, while others gave an explanation in Nahuatl of these same paintings, and finally the immortal Father Sahagun, without whose work we should know little concerning the religious beliefs of ancient Mexico, translated the Nahuatl text into Spanish, forming at the same time a Nahuatl glossary. Until now only a Spanish translation has been published, made, without doubt, from the codex formerly belonging to the Monastery of Franciscans and today in possession of the Real Academia de Historia in Madrid. The other parts of the work remain

unpublished. One of these exists in the Biblioteca del Palacio, Madrid, and the other is in Florence. This work of Sahagun, the prototype of the Codex Telleriano-Remensis, we are happy to say, will shortly be published under the editorial supervision of the learned Mexican scholar, Troncoso. (See note 2 near the end of this paper.)

Another codex which is of great value is called the Mendoza Codex, or Codex Mendocino, which was made in somewhat the same way as the one just referred to, but by order of Viceroy Mendoza for Charles V. The original, on maguey paper, is lost, but a copy on European paper is in the Bodleian Library, Oxford.

These works are similar in their post-Columbian origin to the Codex Telleriano-Remensis, and I have dwelt somewhat on them to emphasize the fact that two classes of codices exist—those made on deerskin and on paper before the discovery of America, and those made shortly after the conquest either on maguey paper or European paper with written explanations of their meaning. They form the key to our knowledge of the old Mexican people. Of this class of codices there are the two before mentioned,—Codex Sahagun and Codex Mendoza,—and in addition there is a valuable unpublished work in Florence shortly to be brought out by the Peabody Museum, to which Troncoso has given the name of Codex Nuttall in honor of the accomplished woman who has been instrumental in its production—Mrs Zelia Nuttall. (See note at the end of this paper.) There is a fragment of a similar work in the National Library at Paris, formerly the property of Goupil, by whom it was presented to the library. It has been published in an inferior manner as an appendix to the work of Duran. There is also in the Paris library the Codex Telleriano-Remensis, and in Rome is preserved the Codex Vaticanus 3738.

Both of these classes of codices, the pre-Columbian and the post-Columbian, contain records of Nahuatl history, including

migrations, the succession of chiefs, conquests, and tributes, also the ritual employed by the priests in fortune-telling; the sacred calendar, and records of fixed and movable religious festivals, as well as astronomical material. These works remained practically buried to the world until about sixty years ago when Lord Kingsborough published in his great volumes a few of the codices which had escaped destruction and had found their way from time to time into the libraries and private collections of Europe. The books, however, cannot be studied to the best advantage in Kingsborough, because Aglio, the artist who was employed in copying them, not understanding anything of their contents, in some instances has given the wrong sequence to the pages and in very many cases has given the wrong color to figures. It is also to be noted that since Kingsborough's time a number of hitherto unknown codices have been found. It is desirable that they should be published in their original form; that is, in the case of the greater number of pre-Columbian codices, in long strips, folded screen-fashion and painted on both sides.

It is only during the last fifteen years that an attempt has been make to reproduce these priceless records in exact facsimile, so far as their original form is concerned. In 1892 the first codex appeared in this manner, being the Maya Codex Cortesianus, published in Madrid.

During the last six years a great impetus has been given to the study of these codices by the reproduction of a number of the books which were first brought out by Kingsborough. Students of anthropology, and especially of ancient America, owe a debt of gratitude to the Duke of Loubat for the excellent manner in which he has had these reproductions made and for their generous distribution among the great libraries and museums of the world, whereby they are made practically available for careful investigation and study.

The following list may be useful to the student of ancient Mexican history, and it indicates the increased interest in this

branch of American archeology. Nearly all of the more important codices are now within the reach of students, and we may confidently look forward to the clearing up of many obscure points in Mexican mythology, due to the wide distribution of these facsimiles and the ever-increasing activities in the field of American anthropology, both in Europe and in America.

1885

MAPPE TLOTZIN.—A painting, on prepared skin, relating to pre-Columbian Nahuatl history, with explanation written in the Aztec language; in the Aubin-Goupil collection, National Library, Paris. Published in Paris in *Mémoires sur la Peinture Didactique et l'ecriture des Anciens Mexicains*, par Aubin.

MAPPE QUINATZIN.—A painting on maguey paper relating to pre-Columbian Nahuatl history, with explanation written in the Aztec language; in the Aubin-Goupil collection, National Library, Paris. Published in Paris in *Mémoires sur la Peinture Didactique et l'ecriture des Anciens Mexicains*, par Aubin.

1886

LIENZO OF JUCUTACATO.—An ancient painting on native cloth from the district of Uruapan, Michoacan. Published by Dr Nicolas León in the *Smithsonian Report* for 1886, Part I., with a study of its contents.

MAPA DE TEPECHPAN.—A painting, on maguey paper, relating to the history of the Aztecs. In the Aubin-Goupil collection, National Library, Paris. Published without colors, in *Anales* of the Museo Nacional, Mexico, tomo III, entraga II.

1887

CODEX PERESIANUS.—A pre-Columbian Maya codex preserved in the National Library, Paris. Published by Leon de Rosny, with an introduction.

1890

TRIBUTE ROLL OF MONTEZUMA.—A pre-Columbian codex preserved in the Museo Nacional, Mexico. Published by Dr Antonio Peñafiel in *Monumentos del Arte Mexicano Antiguo.* (See note on the "Tribute Roll of Montezuma," published in *Transactions* of the American Philosophical Society.)

CODEX SANCHES SOLIS.—A pre-Columbian codex in possession of Baron Waecker-Gotter in Germany. Published by Dr Antonio Peñafiel in *Monumentos del Arte Mexicano Antiguo.*

LIENZO DE (AMOLTEPEC) YOLOTEPEC.—A pre-Columbian painting on cloth preserved in the American Museum of Natural History, New York. Published by Dr Antonio Peñafiel in *Monumentos del Arte Mexicano Antiguo*, from an inexact tracing.

MEXICAN PICTURE CHRONICLE OF CEMPOALLAN.—A post-Columbian codex, on maguey paper, in possession of Bernard Quaritch, London, and published by him.

1891

DOCUMENTS POUR SERVIR A L'HISTOIRE DU MEXIQUE.—A catalogue of the Aubin–Goupil collection of pre-Columbian and post-Columbian codices and maps. With an atlas of eighty plates of reproductions without colors. Published in Paris under the editorship of Eugéne Boban. This collection is now preserved in the National Library, Paris, and comprises 403 pieces, many of which, however, are manuscripts.

1892

CODEX PORFIRIO DIAZ.—A pre-Columbian codex preserved in the Museo Nacional, Mexico; published in *Antigüedades Mexicanas.*

CODEX BARANDA.—A post-Columbian codex preserved in the Museo Nacional, Mexico; published in *Antigüedades Mexicanas.*

CODEX DEHESA.—A pre-Columbian codex preserved in the Museo Nacional, Mexico; published in *Antigüedades Mexicanas.*

LIENZO DE TLAXCALA.—A post-Columbian series of paintings on cloth; published in *Antigüedades Mexicanas*, from a copy in the Museo Nacional, Mexico. The original is lost.

TRIBUTE ROLL OF MONTEZUMA.—In *Transactions* of the American Philosophical Society, Philadelphia, N. S., vol. XVII, Part ii. Six plates, reproducing paintings on maguey paper preserved in the library of the Society. The first four are fragments of pages from the original Tribute Roll, which is in the Museo Nacional, Mexico. A facsimile of this codex, minus the four leaves, which are supplied from a poor copy on European paper, is published by Dr Peñafiel in his *Monumentos del Arte Mexicano Antiguo*, Berlin, 1890.

CODEX BECKER (MANUSCRIT DU CACIQUE).—Published in Geneva by Henri du Saussure.

CODEX COLOMBINO.—A pre-Columbian codex preserved in the Museo Nacional, Mexico; formerly known as the Codex Doremberg. It is unquestionably a part of the Codex Becker. Published by the Mexican government in *Antigüedades Mexicanas*.

CODEX CORTESIANUS.—A pre-Columbian Maya codex preserved in the Museo Arqueologico Nacional, Madrid. This codex is folded screen-fashion and was the first to be reproduced in this manner in exact facsimile of the original. (It is to be regretted that all of the reproductions in this list are not published in their original form.)

CODEX DRESDENSIS.—A pre-Columbian Maya codex preserved in the Dresden Library. Published by Dr E. Förstemann.

1893

DIE MEXICANISCHEN BILDERHANDSCHRIFTEN ALEXANDER VON HUMBOLDT.—A series of paintings on maguey paper preserved in the Royal Library, Berlin. Published by Dr Eduard Seler with a study, in German, of their contents.

CODEX DE 1576.—A post-Columbian codex in the Aubin–Goupil collection, National Library, Paris. Published by Leroux.

1895

CODEX FERNANDEZ LEAL.—A pre-Columbian codex now in the collection of Mr E. J. Molera, San Francisco. Published in Mexico by Dr Antonio Peñafiel.

1896

CODEX VATICANUS, NO. 3773.—A pre-Columbian codex preserved in the Vatican Library, Rome. Published by the Duke of Loubat, and the first of the superb reproductions which he has so lavishly distributed to libraries and museums.

1897

MANUSCRITO AMERICANO NUM. 4.—A post-Columbian codex preserved in the Royal Library, Berlin. Published in Mexico by Dr Antonio Peñafiel.

1898

MAPA DE CUAUHTLANTZINCO, OR CODEX CAMPOS.—A post-Columbian series of paintings preserved in Cuauhtlantzinco, near Puebla. Published as Bulletin III, Department of Anthropology, University of Chicago, by Prof. Frederick Starr.

CODEX BORGIA.—A pre-Columbian codex preserved in the Ethnographical Museum of the Vatican, Rome. Published by the Duke of Loubat. An exhaustive treatise on this codex was written at the close of the eighteenth century by P. José Lino Fábrega, and was published, with parallel texts in Italian and Spanish, in the *Anales* of the Museo Nacional, Mexico, in 1900.

1899

CODEX BORBONICUS.—A pre-Columbian codex preserved in the library of the Chamber of Deputies, Paris. Published for the first time by the house of Leroux. An exhaustive study of its

contents, in Spanish, was published in Florence by Sr Francisco del Paso y Troncoso, Director of the Museo Nacional of Mexico.

CODEX COSPIANO (formerly BOLONIA).—A pre-Columbian codex preserved in the library of the University of Bolonia. Published by the Duke of Loubat.

CODEX TELLERIANO-REMENSIS.—A post-Columbian codex preserved in the National Library, Paris. Published by the Duke of Loubat.

1900

LIENZO DE ZACATEPEC.—A pre-Columbian painting on cloth from the Mixteca, State of Oaxaca. Published in Mexico for the first time by Dr Antonio Peñafiel.

CODEX VATICANUS, NO. 3738 (RIOS).—A post-Columbian codex preserved in the Library of the Vatican, Rome. Published by the Duke of Loubat.

TONALAMATL AUBIN.—A pre-Columbian codex preserved in the National Library, Paris. Published by the Duke of Loubat with an exhaustive study of its contents in German by Dr Ed. Seler. Translated into English and published in London in 1901.

1901

CODEX FEJÉRVÁRY-MAYER.—A pre-Columbian codex preserved in the Free Public Museums, Liverpool. Published by the Duke of Loubat. An exhaustive study of its contents by Professor Seler is now in press. (See page 546 of this magazine.)

PINTURAS JEROGLIFICOS OF THE CHAVERO COLLECTION, PARTS 1 AND 2.—A series of paintings published by Alfredo Chavero in Mexico. The paintings reproduced in the first part should be most carefully studied in order to verify their authenticity.

A magnificent pre-Columbian codex preserved in a private library in England is now in press and is to be published by the

Peabody Museum, Harvard University, with a study of its contents by Mrs Zelia Nuttall, by whom it was discovered.

Two similar works of great value are soon to be published, namely:

(1) A post-Columbian codex preserved in the Biblioteca Nazionale, Florence, bearing the title *Life of the Indians*. It is on European paper, and most of the paintings have explanations in the Spanish language. This will be published by the Peabody Museum, Harvard University, with a study of the work by Mrs Zelia Nuttall.

(2) The Sahagun Codex, a series of post-Columbian paintings accompanying the Nahuatl text of Padre Sahagun's *Historia General de las Cosas de Nueva España*, as yet unpublished, will be reproduced by the Mexican government with a translation of the Nahuatl text by Sr Don Francisco del Paso y Troncoso.

Among the pre-Columbian codices published by Kingsborough, there still remain to be brought out in exact facsimile the following:

1. Original painting, collection of Sir Thomas Bodley; in the Bodleian Library, Oxford. 40 pages.
2. Original painting, Selden collection, Bodleian Library, Oxford. 20 pages.
3. Original painting, Selden collection, Bodleian Library, Oxford. A roll making 12 pages in Kingsborough.
4. Codex Land, Bodleian Library, Oxford. 46 pages.
5. Vienna Codex, in Imperial Library, Vienna. 68 pages.
6. Codex Mendoza, a copy on European paper, Bodleian Library, Oxford.

BOOK REVIEWS

Calendar History of the Kiowa Indians. By JAMES MOONEY. (From the Seventeenth Annual Report of the Bureau of American Ethnology.) Washington: 1898 [1901]. Pages 129–445, plates and figures. Roy. 8°.

This work of over 300 pages is an original contribution of the highest value to ethnography. Its title affords but an imperfect idea of its scope; for, in addition to an elaborate description of the Kiowa calendars, the author gives us, in 106 pages, a sketch of the tribe including its documentary history, a list of western military and trading posts, the most extensive glossary of the Kiowa language yet published, and other items of information which lead to a thorough understanding of the calendars.

It is understood that this work is but one of a series on the Kiowa which the author contemplates publishing. If he lives to complete his task—which there is every prospect of his doing, as he is yet a young man—the small and rather backward tribe of the Kiowa will be better represented in scientific literature than any other within our borders.

The pictorial calendars which Mr Mooney describes have many characteristics in common with the Dakota calendars published in previous reports of the Bureau of Ethnology. They do not cover so long a period of time as the Dakota calendar of Lone-dog,—the latter includes seventy-one years, while the Kiowa calendars include but sixty,—yet the Kiowa records are in one respect much the superior, as they give two historic items for each year, instead of one like the Dakota records. They show a summer event and a winter event. As our year begins in winter it is often difficult or impossible to tell in which year, according to our reckoning, the event symbolized in the calendar occurred; but there need be no doubt about the summer events of the Kiowa. There are symbols to indicate the season.

In addition to the four annual calendars described, there is a monthly calendar covering a period of three years. The author of this calendar, Anko, after giving a copy of his work to Mr Mooney, continued his record, and it will interest the faculty to learn that he made it largely a clinical history of the case of his consumptive wife. So

far this is the only monthly calendar discovered among the North American tribes.

It is notable how well these pictorial stories of the Kiowa are often corroborated by our own historical records.

The whole work has been painstakingly performed. It exhibits, like all of the author's works, the results of patient, scholarly research expressed in clear, concise language. It is a mine of valuable information; yet there are a few unimportant points on which we venture to differ with the author, if for no better reason than to air our own knowledge and show that we have actually read the book.

On page 142 the credit for discovering the Lone-dog winter count, which really belongs to Lieutenant Reed, is given to Colonel Mallery. This is merely an oversight on the part of the author. From conversations and correspondence we have had with him, we are aware that, before writing this book, he knew well the history of this "winter count" and probably saw it before Colonel Mallery did. It is not certain that "The tobacco upon the head of the ancient *taíme* is another evidence of the northern origin of the Kiowa" (p. 240), since, in prehistoric days Indians of the south and southwest cultivated, or culled in a wild state, different species of *Nicotiana*. It is not probable that the officer who, in 1867–'68, "wore upon his shoulders the eagle or thunderbird" was General Winfield S. Hancock as here stated (p. 321), since the eagle designates the rank of colonel.

The list of "military and trading posts, missions, etc.," has evidently been compiled with great care, yet from our own personal experience, without reference to any authorities, we are able to correct the dates in three cases. The period of military occupancy of Fort Union, Montana, was 1864–65, not 1867 as given in the list. It was our lot to serve with U. S. Volunteers there in 1865 and to come away with them when they abandoned the post. It was never garrisoned by troops after that; but was razed soon after Fort Buford was established in 1866. Fort Berthold, in what is now North Dakota, was first occupied by troops in 1864, not 1865 as given. The list tells us that Fort Pierre, South Dakota, was occupied by troops in 1865–67; but in the former year we saw it in ruins, with little left to mark the site save a few standing chimneys. We know that no troops were even camped in its neighborhood during the years mentioned.

The two excellent maps are very instructive, showing lands and nations known in old days to the Kiowa, and various wanderings of the tribe in their migrations, trading expeditions, friendly visits, and war excursions, on foot and on horseback, before the advent of railroads

made long excursions easy. The wanderings cover an area of about 2000 miles from north to south and 1000 from east to west.

The illustrations are numerous and well chosen, and the work is presented in the excellent form characteristic of the publications of the Bureau of American Ethnology. We regret we cannot speak so well of the binding. Handled with care, the book fell to pieces while we were reading it. WASHINGTON MATTHEWS.

String and other Forms of Strand; Basketry-, Woven bag-, and Net-work. By WALTER E. ROTH, B.A., etc., the Northern Protector of Aboriginals, Queensland. North Queensland Ethnography: Bulletin No. 1. Queensland: January, 1901. 15 pp., 19 pl., 4°.

This is a thorough study, in textiles, of savagery, the people being the aboriginals of North Queensland, Australia. The materials used are animal and vegetal—the former being human, opossum, and kangaroo hair; and tendon from kangaroo tail, snake neck, and emu leg. A list of forty-four plants is given, and in each case a careful statement is made concerning the part employed and the technic. The steps in the manufacture of twine, string, chain-work, knotting, plaiting, fringing, winding, joining, lacing, and border-work are clearly described and graphically illustrated by drawings. The Australian twine makers, especially from human hair, put themselves to greater trouble than do the Amerindians. The spindle consists of three parts, the shank, the fluke (seized to the former by wrapping), and the spindle-string, which performs the double function of holding shank and fluke together, and its free end, double, serves as a vise to grip the hair until the twisting is started. This spindle is used not only in strand twisting, but in twining strands afterward. Mr Roth's own classification of basket-work, bag-work, and net-work is as follows:

(A) Made with one continuous strand:
  Basal strand, straight.
    I "Simple loop" pattern.
    II "Loop and twist" pattern.
    III "Hourglass" pattern.
    IV "Netting stitch" pattern.
  Basal strand, circular.
    I "Simple loop" pattern.
    II "Netting stitch" pattern.

(B) Made with two continuous strands:
  No Basal Strand. "Simple loop" pattern.
  One Basal Strand, Circular. "Simple loop" pattern.

Several Basal Strands, Straight. "Chain twist," "Warp and Weft."

(c) Made with One Continuous and One Noncontinuous Strand.

(d) Made with One Noncontinuous Strand.

The author finds the same difficulty as students of Amerindian textiles in separating, for analysis, basketry from bagging, netting, and matting.

Checkerwork, diagonal plaiting, and twined work are to be seen in the plates, but far the greater number of processes are those which remind one of the netted carrying-frames of the Lower Colorado, of Mexico, and especially of Central America. The most startling similarity to Amerindian ware is that between Mr Roth's plate XIV, of dilly-bags belonging to the coastal districts of north Queensland, and the fish-baskets of the Fuegians at the Straits of Magellan. Other similarities to Amerindian work suggest themselves, but drawings would be needed to make them plain. The Home Secretary's Department, Brisbane, has our hearty thanks for the liberal spirit which it has shown to a brother ethnologist on the other side of the world.

O. T. MASON.

Peru: A History of Coca. By W. GOLDEN MORTIMER, M.D. New York: J. H. Vail & Co., 1901.

Under the above title Dr Mortimer has written a book of real scientific value in an unusually attractive style. The principal object of the work is to call attention to the remarkable properties of the "divine plant of the Incas," in order that the world at large may share in the benefits which the native peoples of Peru and neighboring countries have long derived and continue to derive from its use. In furtherance of this object, evidence is produced of the very real and extensive nature of those benefits, and the properties of the plant are carefully distinguished not only from those of the beverage cocoa, made from the roasted seeds of a species of palm, and from the cocoanut, but also from the anesthetic properties of cocaine, an alkaloid of the plant. The very common confusion of coca with these three substances is shown to have formed a barrier to the recognition of its merits. The best conditions and methods of cultivation and the various medicinal uses of the plant are carefully described. The history of coca seems to show that it has been an important element in the advancement of the Peruvian peoples, and it is here that the work becomes of more specific interest to the anthropologist.

In addition to its physical uses, coca played a prominent part in the

Peruvian ritual and mythology, and was naturally regarded with hostile eyes by the early missionaries, but its evident merits triumphed over their opposition. Mama Coca, the mother or "spirit" of coca, was a conspicuous character in the Peruvian pantheon. Incidentally we learn that in Peru today the name Quichua is applied only to the general lauguage of the Indians, while the Indians who speak it are known as Serranos, or Indians of the mountains. Dr Mortimer seems to apply the name Incans to the various peoples of the former dominion of the Incas. The name is a convenient one and historically correct. It is perhaps not an important objection that Inca was a title confined to the ruler, his relatives and descendants, and used to distinguish them from the rest of the people, but some confusion might result from the use of this name in a wider sense.

Several interesting bits of folklore are introduced into the volume, and there is a thoughtfully written description of Peruvian culture. The need of such a book and the value of this one can hardly be questioned. The anthropological material is accurate and interesting. Minor criticisms however, may be made at a few points. The guinea-pig and the llama are said to have been the only domesticated animals of Peru prior to the Conquest. We may question whether the dog must not be added to this list. The llama is said to be in no way related to the camel (p. 218). Aboriginal peoples are said to have been vegetarians (p. 471), contrary to the theory that the hunter preceded the farmer except in those few favored regions where fruits and vegetables grew wild in unusual profusion. STANSBURY HAGAR.

Codex Fejérváry-Mayer. Manuscrit Mexicain Précolumbien des Free Museums de Liverpool. (M 12014) Publié en chromophotographie, par Le Duc de Loubat. Paris: 1901. Text pp. 1–28. Plates, folded screen fashion, 1–44, in colors.

The original codex was formerly in the collection of M. Fejérváry of Budapest and was reproduced in Kingsborough's great work, but the pages are not given in their proper sequence, nor are the colors accurate. It is one of the best preserved and most beautiful of this class of Mexican antiquities, and its whereabouts seem to have been lost to students until six years ago when it was noticed by the reviewer in the back of a basement case in the Liverpool Museum. It was given to the museum by Mr Mayer, who purchased it from M. Fejérváry. The present edition of the Duke of Loubat is in exact facsimile. The original is painted on prepared deerskin sized with a thin white stucco, and not on maguey paper as generally supposed. The pages are about

square, measuring 6¾ by 6⅞ inches. It contains two blank pages, forming the covers. The work is issued with a brief introduction by the Duke of Loubat, but an exhaustive study of the codex has been made by the eminent Americanist, Prof. Ed. Seler, of Berlin, which is now in press. This is the seventh of the magnificent reproductions of Mexican codices which the student of American antiquities owes to the liberality and intelligence of this patron of science. They are as follows, with the date of publication annexed :

Codex Vaticanus no. 3773, 1896.
Codex Borgia, 1898.
Codex Cospiano, 1899.
Codex Telleriano-Remensis, 1899.
Codex Vaticanus no. 3738, 1900.
Tonalamatl Aubin, 1900.
Codex Fejérváry-Mayer, 1901.

In addition we should include the Codex Borbonicus, published in 1899, by Leroux, of Paris, through the initiative of the Duke of Loubat who made its publication possible.

M. H. SAVILLE.

Explorations in Alaska, 1899, for an All-American Overland Route from Cook Inlet, Pacific Ocean, to the Yukon. By First Lieut. JOSEPH S. HERRON, 8th Cavalry, Commanding Expedition. (War Department, Adjutant General's Office. No. XXXI, March, 1901.) Washington : Government Printing Office, 1901. 77 pp., illustrations, 2 maps, 8°.

The War Department has recently issued a valuable report of explorations in Alaska in 1899 by Lieutenant Joseph S. Herron, Eighth cavalry, under orders to discover, if possible, and survey a feasible "All-American" overland route from Cook inlet to the gold fields of Cape Nome, and the Yukon. After following one or two side trails sufficiently far to demonstrate their impracticability, Lieutenant Herron struck a main trail in June, and with a party of only five men, followed it perseveringly from the coast, in spite of snows and inclement weather, short rations, and the desertion of their Indian guides, until they arrived, six months later, at the new post of Fort Gibbon on the Yukon. A great part of the country traversed was over a mountainous region never before explored or visited by white men. By the new route it is possible to reach either the Cape Nome or the Klondike gold fields at any season of the year without passing through British territory, while the overland distance is shortened by one-half.

A chapter is devoted to the number, location, and condition of the natives in the territory explored, the physical type and home life being illustrated from photographs. A short vocabulary from the upper Kuskokwim is clearly Athapascan, and we are told that the various tribes encountered on the march, although speaking different dialects, are all cognate. As the Chinook tribe a century ago knew Americans only as "Boston men," so now to these Alaskan tribes the United States is "Seattle." The Lieutenant is to be commended for having preserved upon the accompanying maps the native local names along the route, of a number of which he furnishes the rendering. Full credit is given to the men who contributed to the success of the expedition.

JAMES MOONEY.

The Criminal, his Personnel and Environment. A Scientific Study, by AUGUST DRÄHMS, Resident Chaplain State Prison, San Quentin Prison, San Quentin, California. New York: The Macmillan Company, 1900. xiv, 402 pp. 12°.

This book is a careful study of the physical and moral characteristics of criminals made by a person who has had large experience in dealing with them. It is prefaced with an introduction by Professor Lombroso who states that in this treatise he has found nothing contrary to his own observations and convictions, excepting where the author holds that the American criminal differs in physiognomical type from his European contemporary.

This statement seems rather strange in view of the fact that the author is by no means a dogmatic supporter of the school of physical anthropology which Professor Lombroso represents. On the contrary he repeatedly asserts that he does not believe in the existence of a criminal type associated with definite anatomical characters.

The general reader, for whom the book is written, will find it instructive. It is unfortunate that it is hastily written and that the author has not acquired a literary aptitude in the use of English. It abounds in statistics of anthropometric measurements which, after all, the author does not appear to value highly.

Previous hard training in anatomy would have saved the author from some errors and probably would have led him to exclude some material of doubtful authenticity. How, for example, can we distinctly affirm that "the brains of Descartes and Dante were both sub-microcephalic"? Statistics resemble Mr Weller's veal pies in depending for value largely upon the person who makes them.

FRANK BAKER.

How to Make Baskets. By MARY WHITE. New York: Doubleday, Page & Company, 1901. 194 pp., illustrations, 16°.

This is a little text-book for kindergartens and for home pastime. It lays no claim to be a scientific study, but it is mentioned here with unqualified approbation as showing how the industrial arts and esthetic motives of our Indians are gradually fixing themselves in the fine arts of the civilized. Basketry of the Indians in its materials, artistic elements, technic, mythology, and functions, has been elaborately studied by others; and now Miss White gathers the young about her and proposes to exalt the Indian art and to preserve it by reproducing its processes and patterns in rattan, rafia, rushes, and other materials. Some of the terms used are novel. A warp element is called a "spoke," and a woof element a "weaver." In other cases old and well-established terms are laid aside for new ones. In a second edition there ought to be references to the authors who during the last fifteen years have redeemed the art of basketry from destruction. Chapter XV, by Neltje Blanchan, is devoted to "What the Basket Means to the Indian."

O. T. MASON.

Primitive Man. By Dr MORIZ HOERNES. London: 1900. J. M. Dent & Co. 135 pages, 48 figs, 16°.

This neat little volume is one of the Temple Cyclopedic Primers, published at a shilling to provide in a convenient form information which the high-priced encyclopedias place beyond the reach of the average reader. Man's place in nature, characteristics of culture, earliest traces of man, the stone and the metal ages, lake-dwellers, and the earliest Caucasians, form the topics of the chapters. The author is conservative, as he ought to be, in making a summary for popular use of a young and versatile science. There is a poverty of authorities in the bibliography. The only Americans referred to are Brinton (1892), and Dawson (1877, 1887).

O. T. MASON.

PERIODICAL LITERATURE

CONDUCTED BY DR ALEXANDER F. CHAMBERLAIN

GENERAL

Anthony (R.) Le muscle présternal: ses formes fibreuses rudimentaires, leur fréquence chez l'homme et leur présence chez certains animaux. (Bull. et Mém. Soc. d' Anthrop. de Paris, 1900, Ve s., I, 486–514.) Details the results of observations on 52 human subjects (males 30, females 22, of which 11 were fœtuses) and a number of animals. It appears that presternal formations of the kind in question do not occur only in man, but also in the platysternian animals; and in man they are met with at all stages of development. The article is illustrated with 13 text-figures, and a digest of previous investigations precedes the new matter.

Barker (L. F.) On the study of anatomy. (Bull. Johns Hopkins Hosp., Baltimore, 1901, XII, 87–95.) This general discussion, which emphasizes productive study, contains a valuable list of previous addresses on the nature and the subjects of anatomical teaching.

Brown (A. E.) On some points in the phylogeny of the primates. (Proc. Acad. Nat. Sci., Phila., 1901, LIII, 119–125.) The author notes that "the fact that before monkeys, as now known, began to exist, man-like apes were far advanced in development, and that the earliest evidence of existing genera of apes is coëval with that of existing genera of catarrhines, tells enormously in favor of the early and independent origin of anthropomorpha." He also suggests "the multiple rather than the single origin of the *Lemuroidea*."

Brush (C. E.) Notes on cervical ribs. (Bull. Johns Hopkins Hosp., Baltimore, 1901, XII, 114–117.) Brief account of three cases, of which two presented some uncommon variations.

Capitan (L.) Les pierres à cupule. (Rev. de l' École d' Anthrop. d. Paris, 1901, XI, 114–127.) An interesting general discussion, with 13 figures, of "cupped stones" from different parts of the globe, and the various hypotheses relating to their use. Among the theories suggested are: Ornamentation, "idle-work," numeration, amulets, talismans, finger-holes (in case of implements, etc.), miniature bowls, blood-receivers (in sacrifice), polishers, holes used by children for smoothing balls (marbles), etc. The author himself is quite eclectic in his opinion.

Ehrenreich (P.) Wilhelm Wundt's Völker-psychologie. (Globus, Braunschweig, 1900, LXXIX, 21–22.) Critical review and résumé of Wundt's recent work on "Race Psychology," which Dr Ehrenreich thinks may lead to a new era of linguistics. But the American languages, Chinese, etc., have been given none or too little attention in the book.

Gaudry (A.) Sur la similitude des dents de l' homme et de quelques animaux. (Anthropologie, Paris, 1901, XII, 93–102.) This paper, illustrated with 14 figures, discusses the comparative development of the teeth of man and those of certain anthropomorphic apes, fossil and actually existing. The author's conclusion is that, "while with certain animals the complication of the teeth is a mark of progress, with man superiority is indicated by their diminution." Of all teeth considered those of the white race are the most incomplete. Paper read at Congress of 1900.

Giuffrida-Ruggeri (V.) Sui residui della fontanella metopica o mediofrontale. (Riv. di Biol. gen., Torino, 1901, III, 340–342.) Brief critical review of recent literature, with reference to four skulls in the anthropological collection of the University of Rome.

Harrison (R. G.) On the occurrence of tails in man, with a description of the case reported by Dr. Watson. (Bull. Johns Hopkins Hosp., Baltimore, 1901, XII, 96–101.) This paper, illustrated with 6 figures, discusses briefly the general subject, the tail in embryos, etc., with special reference to a tail on a three-months' infant, reported about a year ago by Dr Watson of Baltimore. According to Dr Harrison five cases of "tails" have so far been reported in the United States. The range of estimation of the tail in folk-thought is from the opinion of the Ranas of Poorbunder that the elongation of their spines allied them to the monkey-god, Hanuman, to the views held by their neighbors concerning the "tailed men" of Turkestan, who were held in the greatest contempt.

Höfer (P.) Fortschritte in der Datierung der Steinzeit. (Globus, Braunschweig, 1901, LXXIX, 108–109.) Based on Goetze and Montelius.

Jordan (D. S.) The blood of the nation. (Pop. Sci. Mo., N. Y., 1901, LIX, 129–140.) Continued from previous number. Discusses in popular strain the decay of races through the survival of the unfit in war. Illustrations of thesis from history of ancient empires and of modern America.

Lasch (R.) Die Anfänge des Gewerbestandes. (Ztschr. f. Socialwiss., Berlin, 1901, IV, 73–89.) Seeks to résumé, with references to literature, our present knowledge of the beginnings of industrial classes and special trades and occupations (clothing, pottery, weapons, implements, metal-working, carpentry, etc.) "Home-spun" clothes are well-known among the primitive people of Africa and Polynesia; pottery is very often an art confined (*e. g.*, in New Guinea), to women, or to some special tribe (Nu-Arawaks, *e. g.*, in South America), but sometimes (as with the Northern Bantu in Africa), an art of men,—in parts of Africa, Melanesia, etc., pottery rises to the dignity of an industry for the market; arrow-makers of a special sort occur in many quarters, and the shield-maker among certain Australian tribes touches the point of separate industries; the blacksmith in Africa and the carpenter in Polynesia have a right to consideration as tradesmen, so too the gold and silver worker, the basket-maker, etc. Other callings sometimes restricted to one sex, one portion of the community, one tribe, etc., are tattooing, net-making, house-building, manufacture of household utensils, etc. The author distinguishes the following types of industries: A, House-industry. B, Professional industry (sex-industry, tribe-industry, caste-industry, free, separate industry). The facts in our possession, he thinks, do not allow to dogmatize concerning either the order of evolution of primitive industries or their historical and other relations. In his future investigations Dr Lasch should make use of the studies of Holmes, McGuire, Cushing, Haddon, Mason, *et al.*

Lefébure (E.) L'arc-en-ciel poétique. (Mélusine, Paris, 1901, X, 145–153, 176–186.) Continuation of detailed comparative study of the rainbow in poetry, ancient and modern.

Leggiardi-Laura (C.) Questioni sulle circonvoluzioni cerebrali. (Riv. di Biol. gen., Torino, 1901, III, 304–320.) This article, illustrated with a plate (6 figs.) and four figures in the text, treats of the variation, modes of association, etc., of the cerebral convolutions, the data studied being some 500 human brains investigated during the last two years by the author and Dr Varaglia. The cerebral convolutions are divided into constant and inconstant, — the former comprising nine varieties, and having probably ethnic significance, the latter (pathological, arrests of embryonal development, atavistic, progressive, etc.), being of individual significance. The author considers that the cranio-cerebral relation cannot be reduced to the confines of the cephalic index.

Letourneau (C. L.) Des rêves ancestraux. (Bull. Soc. d' Anthrop. de Paris, 1900, Ve S., I, 425–432.) After some general remarks on dreams and hallucinations, the author, believing that mental impressions, etc., can be inherited, proceeds to argue that dreams of the *déjà vu*, *déjà connu* type ("I seem to have been there before," etc.), and kindred impressions of the individual are "recollections hereditarily transmitted," or *ancestral dreams*. To a similar psychic subsoil may be attributed changes of character at death, infant-prodigies, etc.

von Luschan (F.) Ueber kindliche Vorstellungen bei den sogen. Naturvölkern. (Ztschr. f. Päd. Psychol. u. Pathol., Berlin, 1901, III, 89–96.) After indicating the unfairness of some of the distinctions sought to be made between savage and civilized man and noting the absurdity of some of the reports of casual visitors and the lack of skilfulness on the part of travelers in getting to understand the primitive mind, Dr von Luschan proceeds to combat the view that primitive races are "weak in thinking, and weak in abstract thinking," paying special attention to numeration. In the light of the facts that our Roman numerals represent the fingers of the hand or the hand closed, that our count clearly begins again at 11 (if not before), that French has *soixante-dix* for 70, that Homer did not know the numeral *μύριοι*, that the word *million* had its origin since 1494 (the Romans could only say *decies centena millia*), that *milliarde* dates only from 1830, and that *billion* in German and in French does not mean the same number of millions,—these and other things like the differing names of the milleped ("forty feet" with the Turk, but "thousand foot" in German),—we ought to be cautious about inferences from the mere inspection of the numerals of primitive peoples. Example of real child-actions on the part of the Maoris of New Zealand and of the Konde of the region of Lake Nyassa in Africa are given.

Macalister (A.) Variations in the ossification of the occipital bone. (Proc. Cambridge Philos. Soc., 1901, XI, 150–152.) Treats of the classification of variations in the union of the component elements. The most prolific of varieties is the *planum interparietale*, where there "are normally at least four spots at which ossification begins in this membranous area." Type forms are indicated.

McGee (W J) Man's place in nature. (Science, N. Y., 1901, N. S., XIII, 453–460.) This address appears in full in the American Anthropologist, 1901, N. S., III, 1–13.

Minakov (P. A.) Volosï bŭ antropologitcheskom' otnoshenii. (Russk. Antrop. Zhur., Moskva, 1900, I, No. 1, 83–94.) An anthropological study of the hair, with many tables and 4 text-figures. The various theories are noted, especially those of Pruner Bey and Deniker.

—— —— Nogti tchelovêtcheskoi ruki. (Ibid., No. II, 30–39.) An interesting study, with statistical tables of the nails of the human hand. By a combination of callipers and tape the real breadth (curvature) of the nail was measured, and this, compared with the apparent breadth, gave the index of flattening. Among the conclusions arrived at are the following: Greater chest-circumference is accompanied with broader nails; in individuals who use both hands equally no difference seems to occur between the two hands, but generally right-handed persons have broader and flatter nails on the right hand, and left-handed persons on the left hand. Details as to breadth, flatness, and thickness of the separate finger-nails are given. The subjects of investigation were 278 soldiers and students and a number of new-born children. The work was suggested by the study of Regnault in 1898.

Paul-Boncour (G.) Étude des modifications squelettiques consécutives à l'hémiplégie infantile. (Bull. et Mém. Soc. d'Anthrop. de Paris, 1900, Ve S., I, 359–414.) This first section treats with 2 figures of the femur only, a detailed account with tables of measurements of the condition of six sound and six unhealthy femurs belonging to skeletons of children affected with cerebral hemiplegia. Length, weight, neck of femur, iliac impress, head of femur, cotyloid cavity, angle of neck of femur, curve of diaphysis, obliquity of diaphysis, pilaster, *linea aspera*, flattening of femur, popliteal index, muscle insertion, third trochanter, etc., are discussed at length. The presence of a third trochanter on both healthy and unhealthy femurs seems to weaken the theory of origin from muscular vigor. The healthy femurs, naturally, show the best development.

Peet (S. D.) The serpent and tree. (Amer. Antiq., Chicago, 1901, XXIII, 179–198.) Illustrated general discussion of the serpent and tree idea in the mythologies of both hemispheres, Babylonian, Scandinavian, American Indian.

Rabaud (É.) Conception générale de la monstruosité. (Rev. de l'École d'Anthrop. de Paris, 1901, XI, 97–114.)

Rabaud—*Continued.*

According to Dr Rabaud: "Teratology is the study of the variations of embryonic evolution, leading to the production, under the influence of nutritive modifications, of adult forms differing from the normal ones." Teratology, far from being an accessory part of normal embryology, is an important branch of general biology. The normal state, indeed, is only one particular case, not always the necessary or the general one. Permanence of form is related to permanence of *milieu*. Teratology is thus more comprehensive than normal embryology. The author illustrates his ideas with a schema on page 111.

Regnault (F.) La chronophotographie dans l'etnographie. (Bull. et Mém. Soc. d'Anthrop. de Paris, V^e^ s., I, 421–422.) Brief notes on chronophotographic pictures presented to the museum of the Society, made in 1895 in the laboratory of M. Marey, and of ethnic import.

—— L'évolution du costume. (Ibid., 329–344.) This article appeared also in the *Revue Scientifique*, 1901, 4^e^ s., XV, 103–112. See American Anthropologist, 1901, N. S., III, 178.

Retzius (G.) Om trepanation af hufvudskålen, såsom folksed i forna och nyara tider. (Ymer, Stockholm, 1901, XXI, 11–28.) Discusses, with 10 figures (skulls from Sweden and elsewhere in Europe, Peru, Mexico), trepanation in ancient and modern times. Of the three skulls from Alvastra in Sweden, two are meso-dolichocephalic, and one brachycephalic. In parts of the Balkan peninsula trepanning still flourishes. *See* Almgren (O.)

Rivers (W. H. R.) Primitive orientation. (Folk-Lore, London, 1901, XII, 210–212.) Brief discussion of orientation among certain primitive peoples of Africa, Asia, and Indonesia, and the folk of civilized Europe, particularly the use of right and left for north and south or vice versa, their expression by the same word, etc. For the normal and reversed position of the letter E used in testing eyesight the natives of Mabuing in Torres Straits used the terms for "windward" and "leeward," the former being used "when the open side was towards the direction of the prevailing south-east trade wind." The Heligolanders styled the position of the same letter (used by Cohn) north and south instead of right and left. Dr Rivers is of opinion that primitive man originially oriented himself in relation to his surroundings rather than in relation to himself. Hence the words for "north" and "south" are more original than those for "right" and "left."

Schwalbe (G.) Ueber die Fontanelle metopica (medio-frontalis) und ihre Bildungen. (Ztschr. f. Morphol. u. Anthrop., Stuttgart, 1901, III.) A good discussion with résumé of literature of the subject. Prof. Schwalbe holds that the four centers cannot be explained as a fact of phylogenesis or atavism, but must be regarded as a progressive phenomenon, the result of greater cerebral development. Phylogenesis could account for only two frontals.

Seashore (C. E.) Suggestions for tests, on school children. (Educ. Rev., N. Y., 1901, XXII, 69–82.) Outlines tests of observation, physical measurements, fatigue, sight, hearing, discriminative action, etc., suggested by committee of Iowa Child-Study Society in 1897 and worked out by the author in the laboratory of the State University.

Sorel (G.) La valeur sociale de l'art. (Rev. de Métaphysique et de Morale, Paris, 1901, IX, 251–278.) According to the author the mission of art is to ennoble manual labor and to make it the equal of scientific work. Artistic education, no longer the delight of the idle, is to become the basis of industrial production, that which will clothe labor with an esthetic charm.

Spitzka (E. A.) The redundancy of the pre-insula in the brains of distinguished educated men. (Med. Rec., N. Y. 1901, LIX, 940–943.) After general discussion, treats of the excessive growth and development of the left pre-insula in the two Seguins, father and son. The current view that an exposure of the island of Reil indicates a low form or defective type of brain, must be modified, since in both the Seguins, physicians of high intellectual capacity, such exposure occurs.

Stopes (H.) Unclassified worked flints. (Journ. Anthrop. Inst., Lond., 1900, XXX, 299–304.) This paper, illustrated

Stopes—*Continued.*
with 6 plates showing 70 specimens, treats of flints from Somaliland, Madras, Kent, the terrace gravels of Thames valley, Egypt, etc. The object of this study is "to help to determine the origin of common types of tools many of which have survived until the present day."

Thomas (N. W.) Animal superstitions. (Folk-Lore, London, 1901, XII, 189–194.) Records numerous items of folk-lore relating to domestic and wild animals reported to the author by correspondents in Asia Minor, Turkey, Poland.

Thorndike (E. L.) The intelligence of monkeys. (Pop. Sci. Mo., N. Y., 1901, LIX, 273–279.) Brief account of observations and experiments made in 1900 upon three individuals of the genus *Cebus*. According to Prof. Thorndike monkeys "occupy an intermediate position in every main psychological feature between mammals in general and the human species. In their power of vision, use of the body, physical and mental activity for the sake of activity, method of learning, etc., monkeys are nearer man. These observations of Prof. Thorndike are given in detail in "The Mental Life of Monkeys," which forms Monograph Supplement No. 15 (May, 1901) to the *Psychological Review*.

EUROPE

Almgren (O.) Ett graffält från den äldre färnåldern vid Alvastra i Östergötland. (Ymer, Stockholm, 1901, XXI, 5–10.) Treats, with 4 figures, of a burial place belonging to the first Iron age, discovered in 1900 near Alvastra, in the district of Östergötland, Sweden. The most important contents of these graves were three trepanned skulls, the first recorded from Sweden. *See* Retzius (G.)

Andersson (G.) Ett bidrag till kännedomen om hästens förekomst i Sverige under stenåldern. (Ibid., 79–91.) Discusses with 2 tables (cranium) and 3 text figures, the presence of the horse during the Stone age in Sweden. The skull-fragment in question was discovered in 1900, near Ingelstadt, with flint weapons of the later neolithic period.

Anutchin (D. N.) Veglîť vzylyad' na proshloe antropologiī i na yeya zadatchi bŭ Rossii. (Russk. Antrop. Zhur., Moskva, 1900, I, No. 1, 25–42.) A historical sketch of anthropology in the Russian Empire.

Bacher (J.) Von dem deutschen Grenzposten Lusérn im wälschen Südtirol. (Ztschr. d. Ver. f. Volkskunde, Berlin, 1901, XI, 169–180.) Gives the dialect text and German translation of six folk-tales from Lusérn, a German outpost in the Italian Tirol. Continued from previous number.

Balliot (M.) Tumulus de Perrogney. (Bull. et Mém. Soc. d'Anthrop. de Paris, 1900, V^e^ s., I, 446–447.) In continuing his investigations of the tumuli of Perrogney, Balliot found in one of them a coin of Nero, together with a fragment of a bracelet and a golden buckle. These tumuli were thought to belong to the Marne epoch.

Barbot (J.) Ustensiles et bibelots populaires dans la Lozère. (Rev. d. Trad. Pop., Paris, 1901, XVI, 213–214.) Describes, with 8 text-figures, whistles of young wood, noise instruments from peach-stones and nut-shells; also a guillotine for flies.

de las Barras (F.) Un ensayo de trabajos cefalométricos realizados por alumnos de segunda enseñanza. (Bol. d. l. Inst. libre de Enseñanza, Madrid, 1901, XXV, 44–46.) Gives cephalic, nasal and facial indices and head-circumferences of 19 pupils between 14 and 19 years of age in the Institute of Avila, a Spanish town, 71 miles from Madrid, at the foot of the Sierra Guadarrama. Prof. de las Barras intends to carry on these measurements year by year.

Bartsch (A.) Sagen aus Oberschlesien. (Mitth. d. Schles. Ges. f. Volkskunde, Breslau, 1901, 45–53.) Brief notes of folk-tales from Upper Silesia, relating to water-spirits, mountain-spirits, *moras*, dragon, serpent, mouse, horse, dog, cat, dove, frog, etc. These tales were collected by the author, who is a teacher in Benthen, from his pupils.

Bellucci (G.) Amulettes Italiennes anciennes et contemporaines. (Bull. et Mém. Soc. d'Anthrop. de Paris, 1900, V^e^ s., I, 275–286.) A descriptive list of Italian amulets, ancient and modern,

Bellucci—*Continued.*
exhibited by Signor G. Bellucci at the Exposition of 1900, numbering 72 of each sort.

Beltz (R.) Erläuterung der Karten zur Vorgeschichte von Mecklenburg. (Corrbl. d. deutschen Ges. f. Anthrop., München, 1901, XXXII, 30–32, 37–39.) Continuation and conclusion of Dr Beltz's explanatory discussion of the prehistory of Mecklenburg as indicated on the four maps published by him. The third map deals with the Celtic and Roman Iron age,—up to this time there has been from the Stone age to the Age of Iron a continuity of burial customs, and, inferentially, of population. Then, with the time of the fourth map, comes a break, and a new people, the Wends, dominate Mecklenburg for 600 years, after which the Germanization of the land occurred.

Bischoff (H.) Die germanisch-romanische Sprachgrenze in Belgien und Nordfrankreich. (Globus, Braunschweig, 1901, LXXIX, 94–97.) Critical review of Kurth's recent work on this subject. The difference between political conquest and real taking possession of a country is emphasized. The history of language in this region is of great interest. Here we have illustrated the curious fact that bilingual people ultimately give up their own speech.

Bloch (A.) Galien anthropologiste. (Bull. et Mém. Soc. d'Anthrop. de Paris, 1900, V^e^ S., I, 347–359.) Galen (b. 131 A.D.), the celebrated Greek physician, is for anthropologists the most important writer of antiquity, having made a special study of the organism of the anthropoid ape, and having made observations on various human races. He is also said to have been the first to employ the word σκελετός to the bony ensemble. Dr Bloch cites from the work of Galen passages concerning articulation, musculature, hair, eyes, skin, Celts and Teutons, etc.

—— Interprétation anthropologique du mot Latin *Gallus*, Gaulois. (Ibid., 432–440.) The author produces evidence to show that *Gallus* ("Gaul") is identical with *gallus* ("rooster"), an essentially Latin word. Celts, Galates, and Gauls are words not derived from one root, and therefore not akin to each other. The fact that the Gauls were looked upon as "red,"—in French a ruddy-complexioned man is still described as *rouge comme un coq*,—made the passage from the fowl to the human being easy.

Blümml (E. K.) Beiträge zur Flora der Friedhöfe in Niederösterreich. (Ztschr. d. Ver. f. Volkskunde, Berlin, 1901, XI, 210–213.) After noting the scarcity of literature on the subject, the author gives a list of fifty species of plants found in some seven cemeteries in Lower Austria. An interesting contribution to folk-esthetics.

Body (A.) La légende Spadoise du pied de St.-Remacle. (Wallonia, Liège, 1901, IX, 113–125.) Interesting detailed historical account of the legend of the foot of St Remacle, one of the many stories connected with Spa and its springs. By placing her foot in the miraculous imprint of that of St Remacle, any woman suffering from sterility, who likewise drinks of the waters of Sauvenière, will become a mother.

Brissaud (J.) La couvade en Béarn et chez les Basques. (Rev. d. Pyrénées, 1900, 225–239.) An attempt, after discussing the various theories about the "couvade," and referring to the literature of the subject, to indicate how much truth and how much myth exist concerning it. The cases of "couvade" among the Basques are said to be more historical than actual. In reviewing Dr Brissaud's article in *Anthropologie* (1901, XII, 199), M. É. Cartailhac suggests an element of humor due to reaction against the laws of the Pyrenees so favorable to woman, as having something to do with the couvade tradition. But this would not explain its existence elsewhere in the world.

Bünker (J. R.) Typen von Dorffluren an der dreifachen Grenze von Niederösterreich, Ungarn und Steiermark. (Mitth. d. Anthrop. Ges. in Wien, 1900, XXX, N. F. XX, 109–148.) Contains detailed descriptions, with plans in the text, of Mariasdorf, Willersdorf, Schmeidreuth, Oberschützen, Hattmannsdorf, which villages all lie about the (Lower) Austrian-Hungarian-Styrian border. Situation, population, land division and allotment, taxation, history, etc., are considered. This

Bünker—*Continued.*
paper, representing the results of the author's studies on the spot during portions of the years 1897–1899, is a valuable addition to the literature of the village community.

Buschan (G.) Der Stand unserer Kenntnis über die Basken. (Globus, Braunschweig, 1901, LXXIX, 117–124.) An excellent résumé, with bibliography, of our present knowledge of the Basques,—language, physical characteristics (stature and skull-form in particular), history, etc. Dr Buschan, recognizing an undoubted "Basque type," considers it probable that "this Basque race has arisen from a crossing of the shortheaded (immigrant in early prehistoric times from Asia) and the native (Mediterranean) long-headed race, aided by long ages of inbreeding."

Capitan (L.) Les divers instruments chelléens et acheuléens compris sous la denomination unique de *coup-de-poing*. (Anthropologie, Paris, 1901, XII, 111–118.) Paper read at Congress of 1900, illustrated with 9 text-figures. M. Capitan tries to show that there was really considerable variety in the implements from the oldest alluvium, the so-called *coup-de-poing* representing a long series of implements of divers forms, and probably very diverse uses.

—— Exposition de l' École d' Anthropologie et de la Sous-Commission des Monuments Mégalithiques. Catalogue raisonné et descriptif. (Bull. et. Mém. Soc. d'Anthrop. de Paris, 1900, V^e^ S., I, 295–319.) This excellent descriptive catalogue of the Paris exhibit of the École d' Anthropologie and the Sub-Commission on Megalithic Monuments relates to prehistoric art, architecture, and industries, ranging from the engravings of the cave-men to the specimens (vases, ornaments arms) from the Gaulish cemeteries of the Marne, where the beginnings of Roman influence are perceptible.

Coelho (T.) O Senhor Sete. (A Tradição, Serpa, 1901, III, 56–37.) Continued from previous number. Folk-lore of "seven."

Colson (O.) Le loup-garon. (Wallonia, Liège, 1901, IX, 49–59.) A brief general account of the werwolf in the folk-thought of Belgium. The werwolf is the form the servant of the devil most commonly takes. Like the modern French (*loup-garou*) Walloon has the pleonastic form *loup-warou* ("wolf man-wolf"). Another term in use *vertbouc*, the author considers to signify "man goat." In Hainault the werwolf is replaced by the *tché à tchaînes* ("chien à chaînes") and the dog appears elsewhere in the Walloon country, as the *tchin de l'ronhe* ("chien de la ronce"). The werwolf's elbows and knees are "backwards." In Ardennes the skin he covers himself with is thought to be that of a male wolf. A "lady killer" is said to be *amoureux comme un loup-warou*.

Conradt (Frieda) Das Leben einer deutschen Hausfrau in Kamerun. (Globus, Braunschweig, 1901, LXXIX, 135–140.) Account, with 5 illustrations in the text, of a German woman's round of life in the Cameroons, with notes about the natives.

De Cock (A.) Le garçon au bonnet rouge. (Rev. de Trad. Pop., Paris, 1901, XVI, 217–231.) Text, from Rembeke (West Flanders) of "the red-cap-boy," a pursuit-tale, with reference to 40 variants or similar legends from Europe, Asia, Africa, America, Oceania.

Douchez (L.) Croissance des élèves d'une école professionnelle pendant l'année scolaire. (Bullet. d. l. Soc. libre p. l'étude psychol. de l'enfant, Paris, 1901, I, 34–41). Gives, with three sets of curves, results of measurements of weight, height, and chest girth, taken in 1889–90 and 1890–91 on 269 pupils (aged 12–15 years) in the National Professional School at Vierzon. The author finds the results of Malling-Hansen and Daffner (as to periodicity of growth in weight and height) and those of Binet and Ignatief (as to the retarding influence of examinations) more or less confirmed.

Drechsler (P.) Der Wassermann im schlesischen Volksglauben. (Ztschr. d. Ver. f. Volkskunde, Berlin, 1901, XI, 201–207.) Items of folk-lore about the "water man," and his wife the "water woman," in German and Polish Silesia, and their actions. Among the topics noted are: His charming away of living things into the deep where he lives; his strife with the miller and his wheel;

Drechsler—*Continued*
his variety of form (fish, bird, dog, horse, man, etc.); his laughter and playing with the water. Consecrated bread is a talisman against the water-spirit. He can be caught with a consecrated rope, and subdued with the left hand. The "water man" is particularly at home in Upper Silesia.

Ellis (H.) A study of British genius. (Pop. Sci. Mo., N. Y., 1901, LIX, 209–216.) Continued from previous number. Treats of marriage and family, longevity. British men of genius show a tendency not only to marry seldom, but to marry late, while with women there is "a tendency for the years of greatest reproductive activity to be reserved for intellectual development, by accelerating or retarding the disturbing emotional and practical influences of real life." The statistics as to family "confirm only to a limited extent the belief in the relative sterility of men of genius." Moreover, the average fertility of non-barren marriages is not at all small. In general, "families of men of genius differ from genius-producing families by approximating to normal families. An excess of boys in the families of men of genius (corresponding to a similar excess in genius-producing families) is suggested by the statistics. The author finds an evolutional reason for the common longevity of men of genius in the fact that "they must live a long time, or they will never become eminent." This, more than the favorable circumstances of intellectual avocations, explains why death comes so late,—fame in most walks of life being very slowly achieved. A very low mortality is noticeable between the ages of 53 and 57, —"after the first climax at 49 the feeble have mostly died out, and the vigorous are then in possession of their best powers and working at full pressure." Fifty-seven seems to be "a critical age at which exhaustion and collapse are specially liable to occur."

—— A study of British genius. (Ibid., 266–272.) This seventh section of Mr Ellis' study discusses the pathology of genius, — brain-lesions, consumption, asthma, angina pectoris, gout, stone, insanity, and other rather frequently occurring affections are referred to. The author's general conclusion seems to be that "if the man of genius is all the better for a slight ferment of disease [gout, *e. g.*], we must not forget that if he is to accomplish much hard work he also requires a robust constitution." Gout in the joints tends to make the mind of the genius "abnormally clear and vigorous"; in the blood, "to abnormally overcloud his brain." The relationship between genius and insanity "is far from being either so frequent or so significant as is assumed by some writers"—for "genius cannot be accurately defined as a disease." The statistics of British men of genius "do not furnish a single shred of evidence in support of the theory that genius is an epileptoid neurosis." While neurasthenia is common, "grave nervous diseases of definite type" are rare. Clumsiness in the use of the hands and in walking are, Mr Ellis thinks, of considerable significance.

Ernault (E.) Dictons et proverbes Bretons. (Mélusine, Paris, 1901, X, 158–163, 187–188.) Continuation of interpretative catalogue of Breton proverbs and sayings: *Fier-Fossé.* Breton text and French translation are given.

Eysn (Marie). Über einige Votivgaben im Salzburger Flachgau. (Ztschr. d. Ver. f. Volkskunde, Berlin, 1901, XI, 181–186.) Describes, with 8 figures in the text, certain face-urns and wood-carvings (now substituted by wax models) offered up as votive gifts at sacred places near Salzburg in extreme western Austria. The former are offered up on account of headache; the latter for affections of the internal organs. Other votive customs are also noted.

von Fellenberg (E.) Ueber den Bronzefund in Muri bei Bern. (Verh. d. Berl. Ges. f. Anthrop., 1901, 34–36.) Brief account of bronze remains (statuettes of deities, etc.) from Muri belonging to the Roman period. These were discovered partly in 1660, partly in 1832.

Fuchs (K.) Magyarische Grabpfähle. Mitth. d. Anthrop. Ges. in Wien, 1900, XXX, N. F. XX, 149–151.) Brief account, with 18 figures in the text, of the "grave-posts" of the Székl people buried in Kronstadt in Transylvania. In the Székl dialect these posts are called *sir-fa* ("grave-wood"), and are set up some time after the interment, when a fair brings the relatives to town. The "grave-posts" look very much like the end-posts of houses or even of some

Fuchs—*Continued.*
of our old bedsteads and like pieces of furniture. The author gives also, in Magyar with German translation, five epitaphs from these graves. The dead here concerned are mostly soldiers and domestics. The inscriptions belong to the folk.

Garson (J. G.) The metric system of identification of criminals, as used in Great Britain and Ireland. (Journ. Anthrop. Inst., Lond., 1900, XXX, 161–168.) Detailed account, with schedules, of Dr Garson's modification of the Bertillon-Galton systems. Technics, liability to error, records, etc., are treated of. The great utility and applicability of the Galton finger-print tests are doubted. For British criminals the Garson system is said to have worked well. A fact of interest in this connection is that in India, by reason of the impossibility of securing, at widely distant stations, accurate observers, the Bertillon system has practically been abandoned in favor of Galton's finger-print test.

Haddon (A. C.) The language and origin of the Basques. (Nature, London, 1901, LXIV, 90–91.) A brief review of contemporary scientific opinion on the subject.

Hammarstedt (E.) Lussi St. Lucia. (Medd. fr. Nord. Mus., Stockholm, 1898 [1900], 1–38.) A detailed discussion, with a plate and a text-figure of the worship of St Lucia in Christian lands and its relation to heathen religions. The author concludes that the festivals of St Lucia, in the Catholic countries of Europe, are largely heathen survivals. In Scandinavian folk-belief Lucia is a personification of growth in Nature, given perpetuation by the Christian church.

Hamy (E. T.) La grotte néolithique de Géménon, Bouches-du-Rhône. (Bull. d. Mus. d'Hist. Nat., Paris, 1900, 405–409.) Brief description with measurements of male and female skulls found in the Géménos grotto in 1876, and now in the Museum, also of a skull from a pre-Roman tumulus in Peyrolles, which reproduces the characteristics of the Géménos crania. The female skull is rather voluminous (capacity 1,605 + ccm.), and all three are dolichocephalic.

—— Note sur une sépulture néolithique de Fonvieille-lès-Arles. (Ibid., 1901, 8–10.) Brief descriptions, with measurements, of four skulls (one brachycephalic) from the grotto of Castellet and a tomb at Fonvieille, investigated in 1871. Dr Hamy considers that the fourth skull indicates the presence in Provence at the end of the Neolithic period of "a brachycephalic, eurygnathous element, which in one day has risen to be the preponderating one."

Harou (A.) Notes sur les traditions et les coutumes de la Province de Liège. (Rev. d. Trad. Pop., Paris, 1901, XVI, 110–116.) Items of folk-lore from Liège relating to folk fauna and flora, astronomy and meteorology, human life, the human body, folk-medicine, dreams, etc. When one gapes or yawns it is said "his heart is *drowned*." To place a child at full length on the ground and jump over him will stop growth. At Esneux tomatoes are still called "love-apples" (*pommes d'amour*).

Heusler (A.) Die altnordischen Rätsel. (Ztschr. d. Ver. f. Volkskunde, Berlin, 1901, XI, 117–149.) A detailed discussion of the old Norse riddles in the Hervarar saga, with estimate of their poetical qualities and their value as culture-material. According to the author they belong to the very best riddle-verses, and were thoroughly popular in their nature, when one takes into consideration the social relations of Iceland at the time,—they are Norse, pre-literary, pre-Christian, pre-chivalric, and in them lives the Viking age. Two thirds of the *motifs* are taken from nature, and one of the commonest of these is the vivifying of the inanimate.

Höfler (M.) Sankt Michaelsbrot. (Ibid., 193–201.) Describes, with 4 text-figures, the St Michael's bread or cakes and certain customs connected with them in various countries of Europe (Germany and Switzerland in particular.) On Michaelmas day offerings were commonly made to the dead, and the day was thought to have influence on seed-time and harvest. According to Dr Höfler, the St Michael customs prove that the Teutonic New Year was connected with a pronounced funeral ceremony and a harvest-festival.

Höfler—*Continued.*

—— St. Hubertus-Schlüssel. (Ibid., 207–210.) Brief account, with a figure in the text, of two St Hubert "keys" (really long iron nails, with seal-shaped heads) from the Spessart. These "keys" are used in cases of hydrophobia to cauterize the wound or to brand the dog. Directions for their use are cited from a manuscript of 1757.

Hoppin (J. C.) Three Argive lekythi in the Museum of Fine Arts in Boston. (Amer. Journ. Archæol., Norwood, Mass., 1900, IV, 441–457.) Detailed description (with 3 plates) and discussion of three lekythi of somewhat uncertain history, which the author styles "Argive," rather than "Proto-Corinthian," since "the rightful home of the style lies in the Argolid,"—which theory he produces evidence to support. The Argive style is a direct offshoot of the Mycenæan and not a connecting link between the geometric and the Corinthian, being older than hitherto believed.

Ihm (M.) Ein römisches Mosaik aus Veji (Globus, Braunschweig, 1901, LXXIX, 250–252.) Description with cut of a Roman mosaic from Veii (Isola Farnese) representing the taking on board ship of an African elephant,—Veii may have been one of the old wild-animal depots of the Imperial régime. The mosaic was discovered in 1889.

mbert (M.) L' archéologie à l' Exposition de 1900. (Bull. Soc. d. Amis d. Sci. et Arts de Rochechouart, 1900, X, 57–66.) First part of notes on the display relating to prehistoric archeology at the Paris Exposition. The megalithic monuments; the Piette collection of specimens of art from the Magdalenian epoch in bone, ivory, and horn (some 20 representations of the human figure are included), and other collections representing the industries of the period (the most remarkable specimen is an engraving of a double phallus); collections illustrating the art and activities of cave-man, etc., are briefly referred to. The article is accompanied by 2 plates containing 8 figures.

Ivanovski (A. A.) D. N. Anutchin. (Russk. Antrop. Zhur., Moskva, 1900, I, No. 1, 1–24.) A sketch, with portrait, of the 25 years' scientific activity of Anutchin, the eminent Russian anthropologist, whose jubilee was celebrated March 30, 1900. A bibliography of his writings (1873-1900), containing 201 titles, chiefly in Russian, is appended.

Janvier (Catharine A.) Vine-grafting in southern France. (Folk-Lore, London, 1901, XII, 194–197.) Reports from Provence the custom (now obsolete, or at least obsolescent) of having the first grafting done by a young (healthy, good, and beautiful, if possible) virgin.

K. (L.) Aus'm Wellsgrund. (Mitth. d. Schles. Ges. f. Volkskunde, Breslau, 1901, 53–58.) Notes on places and names, peculiar words and expressions, technical terms, etc., recorded from a native of Wellsgrund, *i. e.* Wölfelsgrund,—the text is in the dialect of the locality, with transcription of chief words into literary German. Names of villages, mountains, meadows, roads, streams; of individuals, nicknames, abbreviations; calls for domestic animals; names of animals and plants; dialect phrases and words; names of servants; agricultural terms and names of house and farm furniture and implements; expressions relating to forestry and hunting; terms of abuse, etc., are enumerated.

K. (Z. A.) "Przepowiadki" z Jóswowa. (Wisła, Warszawa, 1901, XV, 15–16.) Facetiæ from Jóswów in the Lubelsk district.

Kaindl (R. F.) Aus der Volksüberlieferung der Bojken. (Globus, Braunschweig, 1901, LXXIX, 150–155.) Interesting sketch (with picture of dance) of the folk-life of the Bojke, a Ruthenian people of the Carpathians, neighbors of the Huzule. House and farm, festivals, superstition, folk-magic and folk-medicine, death-watch, St Andrew's and Christmas days, Easter, St John's day, love-oracles, the "Majki," or maids of the rocks, music, property, etc., are treated. With these people the memory of "the terrible Tatars" still lingers.

—— Ruthenische Hochzeitsge bräuche in der Bukowina. (Ztschr. d. Ver. f. Volkskunde, Berlin, 1901, XI, 158–169.) First part of an account of the wedding-customs of the Ruthenians of the Bukowina, in eastern Austro-Hungary.

Kaindl—*Continued.*
A detailed description (with Ruthenian text and German translation of the songs used) is given of a wedding among the Ruthenians of the foot-hills between Wiznitz and Berhomet on the river Sereth. Consent of the parents is required even when the contracting parties are of age; marriages between blood-relations are permitted only with the sixth degree, etc. Betrothals are binding, and marriage is regarded as irrevocable.

Karutz (R.) Eine schottische Rachepuppe. (Globus, Braunschweig, 1901, LXXIX, 110–111.) Describes, with figure, a "witch doll" from Scotland now in the Lübeck Museum, with some remarks on sympathetic magic.

Khvoïka (V.) Découvertes paléolithiques ques récemment faites en Russie. (Anthropologie, Paris, 1901, XII, 158–159.) Brief abstract of paper read at Congress of 1900. Treats of the investigations up to the present of the paleolithic station discovered in 1894 on St Cyril St. in the city of Kiev,—here some 50 skeletons of the mammoth, remains of a rhinoceros, tree-trunks, flint implements, etc., have been found. The most interesting specimens, however, are two mammoth-tusks, one of which has been incised and notched by a flint tool, the other is covered with neat engravings, which represent apparently fauna and flora of the time. The condition of these tusks, Prof. Khvoïka thinks, proves that here man was contemporary with the mammoth, and did not follow him, as Prof. Anutchin holds.

Koren (A.) Die Körperlänge norwegischer Soldaten. (Corrbl. d. deutschen Ges. f. Anthrop., 1901, XXXII, 46.) Brief résumé of the results of the measurements of 1,284 soldiers in their twenty-second (1893) and twenty-eighth years (1899.) Increase of stature during this time was noted in 83.41%, decrease in 6.07%, no change in 10.52%. These investigations clearly indicate that there is not a little individual growth after the twenty-second year and that such growth has not entirely ceased even at the twenty-eighth year. The average height of the 1,284 soldiers was, in 1893, 169.71 cm., in 1899, 171.34 cm., an increase of 1.63 cm. Measurements taken of 48 soldiers in 1898 and 1899 show an average increase for the year of 1.0 cm.

Law (L. A.) Death and burial customs in Wiltshire. (Folk-Lore, London, 1900, XI, 344–347.) Death omens and portents, fear of corpses, ghosts.

Lazęga (R.) Powiat Brodnicki. (Wisła, Wârszawa, 1901, XV, 29–51. An historical account, based upon recent studies, of the district of Strassburg (Polish Brodnick) in West Prussia, near the border of Poland. With map.

Ledieu (A.) Formule enfantine pratiquée en Picardie et en Suisse. (Rev. d. Trad. Pop., Paris, 1901, XVI, 194–196.) Text of a counting-out rhyme with comments. The rhyme contains names (now disguised) of children,—schoolmates at the time of its creation probably,—and is used in connection with the running game called *au fiou*, to tell by eliminations who is "it."

Lewis (A. L.) The stone circles of Scotland. (Amer. Antiq., Chicago, 1901, XXIII, 199–203.) Brief account of the Ring of Brogar, the Stones of Stenness (Orkney), the Callernish Circle (Island of Lewis), with notes on the Inverness and Aberdeen types. A detailed account of the author's investigations appears in the Journal of the Anthropological Institute (London) for 1900.

Mac Phail (M.) Folk-lore from the Hebrides. (Folk-Lore, London, 1900, XI, 439–450.) Continued from previous volume. Treats of agricultural customs, fairy-lore, leechcraft.

Magiera (J. F.) Uwagi nad przyswojenrami w gwarach naszych. (Wisła, Warszawa, 1901, XV, 145–152.) Treats of assimilation in foreign words in Polish dialects. Numerous examples of German loan-words are given. Humorous renderings and distortions of foreign phrases are also noted: *Pikula pikulorum* for *sæcula sæculorum; za piecem torba* for *sursum corda*, *etc.*

Manouvrier (L.) A propos de la reconstitution plastique du Pithecanthropus. (Anthropologie, Paris, 1901, XII, 103–104.) Brief discussion of the figure of the *Pithecanthropus* as restored by Dr Dubois and exhibited at the Netherland-Indies Exposition, at the Trocadéro. Dr Manouvrier again repeats his belief that the remains of

Manouvrier—*Continued.*
Trinil prove that "the oldest known phase of human development is at the same time the nearest, morphologically, to the anthropoids." Paper read at Congress of 1900.

March (H. C.) Dorset folklore. (Folk-Lore, London, 1900, XI, 107-112.) Items 23-31, continued from previous volume. Folk-medicine.

Maška (C.) La station paléolithique de Predmost en Moravie. (Anthropologie, Paris, 1901, XII, 147–149.) Paper read at Congress of 1900. Gives brief account of what is perhaps "the richest and most important Quaternary station of central Europe," the mammoth hunters' abode (explored by the author in 1882–1894) at Predmost, near Prevov, Moravia. Here the remains of the mammoth abound, and there have been discovered also 20 human skeletons, besides some 15,000 flint implements, a large number of ivory and bone objects, ornaments, etc. The skull of a young adult strikingly resembles the famous Neanderthal cranium. The geometric ornamentation and the carvings on bone and ivory are of great importance.

Mehlis (C.) Prähistorische Schleudersteine aus dem Mittelrheinlande. (Globus, Braunschweig, 1901, LXXIX, 206–208.) Treats, with three text-figures, of sling-stones used in prehistoric times (some in the neolithic period proper). The specimens in question came from the Middle Rhine country,— Frankweiler, Maimont, etc.

Milewska (J.) Kolysanki z Ciechanowskiego. (Wisła, Warszawa, 1901, XV, 17–26. Lullabies from the district of Ciechanów, with text and musical notation.

von Miske (Kálmán, *Freiherr*). Hochhenklige Gefässe von Velem-St. Veit. (Mitth. d. Anthrop. Ges. in Wien, 1900. XXX, N. F. XX, 152–154.) Describes briefly with plate (containing 15 figures) the high-handled vases of the bronze age from the prehistoric settlement whose remains are situated at Velem-St Veit. The outer surface of these vases is highly polished. One of the specimens shows clearly that such vessels were repaired in prehistoric times. Several of the vessels are of transitional (to Hallstatt period) type.

Morin (L.) Les sorciers dans la région Troyenne. (Rev. d. Trad. Pop., Paris, 1901, XVI, 154–161, 267–273.) Treats of witchcraft in the region of Troyes in northeastern France, with illustrations from ecclesiastical legislation, local legends, etc. Some of the villages in this part of the country had a great reputation for witches. Of Galilée the saying went, "in Galilée 12 houses, 13 witches," and of Orquevaux "more witches than horses," of De Sognes that the inhabitants were all witches. A case before the courts of Bar-sur-Aube, as late as 1851, involved belief in witchcraft, and it has not entirely disappeared even now.

de Mortillet (A.) Catalogue de l' Exposition de la Société d' Anthropologie de Paris. (Bull. et Mém. Soc. d' Anthrop. de Paris, 1900, V^e^ S., I, 254–294.) Catalogue of the exhibition of the Anthropological Society of Paris at the exposition of 1900, classified according to the palethnological ideas of G. de Mortillet. The collections embrace specimens ranging from the flints of Thenay (Lower Miocene?) to remains of the Mérovingian period. Included are also some specimens (paleolithic and neolithic) from countries outside of France, and from other continents. A most interesting section of the exhibit was the Bellucci series of ancient and modern Italian amulets. See Bellucci (G).

de Munck (E.) Le Quaternaire des plaines du Hainault. (Anthropologie Paris, 1901, XII, 135–137.) Paper read before the Congress of 1900. A succinct historical *résumé* of the subject, with indications of the geological strata, their depth, contents, etc.

von Negelein (J.) Die Reise der Seele ins Jenseits. (Ztschr. d. Ver. f. Volkskunde, Berlin, 1901, XI, 149–158.) This second section deals with the road taken by the soul in its journey to the other world. Among the topics touched upon are: Nature of the death-path, terms for "to die," length of journey, the path of the demons of disease and death, search for and tests of the presence of the dead, etc. The author notes the fact that in Germany the opinion prevails that the dead wander far and long; "the long journey" is thus a common euphemism.

Nicolet (C.) Les "sîses" et les "hantreies" au pays de Francorchamps. (Wallonia, Liège, 1901, IX, 100–107.) Treats of the social activities of young people in the Francorchamps regions of the Ardennes. The *sîse* is the Ardennes "evening" with its amusements,—on Sunday evening the young men are allowed to call on any young lady, the *hantreie*, the "courting-time."

Northcote (Rosalind) Devonshire folklore, collected among the people near Exeter within the last five or six years. (Folk-Lore, London, 1900, XI, 212–217.) Items relating to goblindom, witchcraft, folk-medicine.

Ohr (J.) Przystowia rabinów. (Wisła-Warszawa, 1901, XV, 53–59.) Forty, three rabbinical proverbs, with explanations, etc.

Parat (A.) Les grottes de la Cure et de l'Yonne. (Anthropologie, Paris, 1901, XII, 119–134.) Paper read at Congress of 1900. Some 100 caves and grottos in the department of Yonne are listed. Some 60 have been more or less explored by the author,—of these some 15 are briefly described, the Trilobite grotto in the Cure valley, and the grotto des Fées, in the same region, being treated more in detail. The Abbé Parat recognizes in the Seine basin four epochs of the cavern period, differentiated geologically and by the fauna and remains of human industry. The last epoch has a fauna quite different from the rest and the implements are *sui generis*, indicating perhaps emigration at the beginning of the period. In the Trilobite grotto there was discovered the upper portion of the humerus of a reindeer on which was incised a branch of some tree or plant with leaves and flowers.

Paton (W. R.) Folk-tales from the Ægean. (Folk-Lore, London, 1900, XI, 113–119, 333–344; 1901, XI, — 97, 197–208.) Gives the English text of eighteen tales of all sorts concerning a variety of topics, from the islands of the Ægean sea, etc. The articles began in volume X.

Peacock (Mabel) The folklore of Lincolnshire. (Ibid., 161–180.) Items of popular belief relating to stones, the weather, wind, heavenly bodies, love-charms, fairies, giants, goblins, witchcraft and counter-magic, taboos, etc. The author notes that the folklore of Lincolnshire is rather "prosaic" and is "lacking in the beauties which distinguish the conceptions of the Celtic peoples," but "it is scarcely possible yet to come to a definite conclusion as to a connection between Lincolnshire and Scandinavian beliefs." The old custom of "luck-money" on purchases seems bound to disappear, although "on a certain day in August, 1898, a large number of buyers kept aloof from the auction sale in Lincoln market because 'luck-money' was withheld."

Pichler (F.) Ladinische Studien aus dem Enneberger Thale Tirols. (Corrbl. d. deutschen Ges. f. Anthrop., München, 1901, XXXII, 39–40, 41–45.) Besides a discussion of such general names as *Ladin*, etc., and such particular ones as *Enneberg*, the author gives from the folk-speech of the region lists of 170 names of mountains, 300 place-names, some 50 names of streams and lakes, and some 40 valley-names, often with brief historical or etymological annotations.

Piroutet (M.) Note sur les sépultures antérieures à l'âge du fer dans le Jura salinois. (Anthropologie, Paris, 1901, XII, 29–40.) Author cites evidence to show that, while in the Jura region megalithic burials do not occur and sepulchral caverns are extremely rare, tumuli of the neolithic period and the early metal period are not so rare. Purely neolithic burials occur in considerable numbers in the region of Salins,—of some of these brief descriptions are given. Some tumuli of the bronze age are also referred to.

Pommerol (F.) Anciennes prières en patois d'Auvergne. (Rev. d. Trad. Pop., Paris, 1901, XVI, 161–165.) Dialect text with translation of three prayers, one to Ste Barbe, one on the Passion of Jesus Christ, and another with the curious title *Lais vervais-Dieu*, perhaps *Verba Dei*. In the first occur the words *Sint-Outino*, *foutino*, with no significance. Dr Pommerol suggests a transference from pagan mythology. St Outino is certainly a new saint.

Rademacher (C.) Dr Soldan's Ausgrabung einer vorrömischen Stadt bei Neuhäusel in Nassau. (Globus, Braunschweig, 1901, LXXIX, 63–65.)

Rademacher—*Continued.*
Brief account of the discovery by Dr Soldan of an extensive settlement of the Hallstatt period (700–400 B.C.) near Neuhäusel (about two leagues from Coblenz). No Roman remains have been discovered.

Radlinski (I.) Apokryfy Judaistyezno-Chrześcijańskie. (Wisła, Warszawa, 1901, XV, 184–196.) This "preliminary note" treats of Polish apocryphal Judeo-Christian literature. The apocalypses, assumptions, ascensions, etc., of Moses, Baruch, Isaiah, are discussed, with references to literature.

Raff (Helene) Volksmeinungen von der bayerisch-österreichischen Grenze. (Ztschr. d. Ver f. Volkskunde, Berlin, 1901, XI, 219–221.) Items of folk-lore from the Bavarian-Austrian border concerning the Hallthurm fortifications.

Reinach (S.) Acquisitions du Musée de Saint-Germain-en-Laye en l'an 1900. (Anthropologie, Paris, 1901, XII, 166–171.) Describes briefly, with 6 text-figures, the stone, bronze, iron, and gold specimens from France, Ireland, Egypt, Somaliland, Greece, etc., added to the Museum in 1900. Among other things the Museum has recently acquired four of the "statues-menhirs" from Aveyron, which were on exhibition at the Trocadéro.

Reinecke (P.) Ein Grabfund der Spät-La Tènezeit von Heidingsfeld in Unterfranken. (Corrbl. d. deutschen Ges. f. Anthrop., München, 1901, XXXII, 27–29.) From letters and reports dating 1850–1851, the author describes briefly the grave and contents (opened in 1850) at Heidingsfeld, important as being "the first known grave of the late La Tène period in northern Bavaria," and of considerable ethnographic significance besides. There seems to be evidence of Celts in the region about Würzburg in the late La Tène period.

—— Germanengräber der römischen Kaiserzeit aus den rechtsrheinischen Gebieten Süd- und Westdeutschlands. (Ibid., 33–37.) Discusses recent finds of Teutonic remains belonging to the period of the Roman Empire on the Lippe, at Giessen, on the Lahn, on the Main, near the Bodensee, near Heidelberg, at Grossgerau, etc. According to Dr Reinecke the Teutonic skeleton-graves, when compared with the contemporaneous provincial Roman graves, indicate by their contents "the marked difference between the Teutons on the right bank of the Rhine and the provincial Roman population on the left. On the right bank of the Rhine, in spite of evident Roman influence, the connections are with the distant Teutonic regions of North Germany."

Rémond (M.) Douze cent mille ans d'humanité et l'age de la terre. (Anthropologie, Paris, 1901, XII, 105–107.) From mathematical calculations having reference to the inclination of the earth's axis, the author of this curious paper read at the International Congress of Prehistoric Anthropology and Archeology (Paris, 1900), concludes that the earth has been habitable for 3 milliards 400 millions of years, and that man knowing how to fashion implements has existed on it for at least 1,200,000 years.

Richardson (R. B.) The fountain of Glauce at Corinth. (Amer. Journ. Archæol., Norwood, Mass., 1900, IV, 458–475.) Account of the discovery in 1899 (with historical sketch) of the fountain of Glauce, one of the monuments of ancient Corinth. The article is accompanied by a plate and 6 figures.

Rivère (É.) La Dordogne préhistorique. (Bull. et Mém. Soc. d'Anthrop. de Paris, 1900, V^e^ s., I, 422–423.) Brief report on explorations made in 1900, in the Dordogne caves, including a new one, the grotto of Liveyre.

Rosanov (V. N.) Gynekomastiya. (Russk. Antrop. Zhur., Moskva, 1900, I., No. IV, 21–36.) This article, illustrated with 5 text-figures and accompanied by references to the literature of the subject, treats in detail of gynæcomastia in a 17-year-old peasant,—the enlarged mammæ were removed and microscopically examined. At pages 34–35 the anthropometric data of the individual in question are given in detail.

Ruge (S.) Rattenberger Studien zur Volkskunde aus dem unteren Innthal in Tirol und aus Oberbaiern. (Globus, Braunschweig, 1901, LXXIX, 165–171, 183–188.) Topographical, historical, linguistic (sematological) notes on places in the Tirol-Bavarian region of Rattenberg. At pages 185–187 is a

Ruge—*Continued.*
valuable list of place-names in parallel column with the corresponding family-names. The basal words numbering more than 100 used as place names in the Bavarian dialect give rise to more than 4000 place-names in Bavaria, or one-twelfth of all names in use. Some of the names are spelled in very many ways (Reut 22 times), and the number of *Meyer* (Maier, etc.) is legion. This article is illustrated with 5 figures.

Rumel (A.) Obrzędy weselne we wsi Masi. (Wisła, Warszawa, 1901, XV, 7–12.) Brief account of marriage rites at Masi in the Białostock district, government of Grodno (Poland), with texts of songs.

—— Pieśń dożynkowa. (Ibid., 13–14.) Text of harvest-song from Masi.

Schoetensack (O.) A quoi servaient les "bâtons de commandement?" (Anthropologie, Paris, 1901, XII, 140–144.) This paper, read at the Congress of 1900, is illustrated with five text-figures and one plate. According to the author, these *bâtons*, of which a goodly number have been discovered in stations of the Magdalenian epoch (at Veyrier, *e. g.*) are nothing more than *fibulæ* or clothes-fasteners. This ingenious suggestion is emphasized by the plate, on which Dr Schoetensack has portrayed five individuals of the reindeer period in France (typed as Eskimo) wearing *fibulæ* in the fashion suggested. This idea gives a reason for the ornamentation as well as the perforation of these articles. One of the ornaments on the "bâtons" from Veyrier he considers to represent a string of animals' teeth.

—— Sur un os sculpté de la grotte paléolithique de Thayingen. (Ibid., 145–146.) Treats of the figure of an animal carved on a round piece of bone from the paleolithic grotto of Kesslerloch at Thayingen, Switzerland. The specimen is interesting as an example of one-sided sculpture.

Schuchardt (H.) Zum Stande unserer Kenntnis über die Basken. (Globus, Braunschweig, 1901, LXXIX, 208.) Brief but interesting note on the characteristics of the Basque language,—a protest against widespread misconceptions, many of which, repeated by modern authorities, go back to Yanguas in 1843. The "monsters" of Basque composition can easily be equaled in German.

Sébillot (P.) Cultes pré-mégalithiques et préhistoriques. (Rev. d. Trad. Pop., Paris, 1901, XVI, 65–71.) Treats of certain practices (such as girls sliding down stones or rocks, prospective parents or newly-married people rubbing themselves against stones or rocks, running round such objects, passing the head, hand, or a child through pierced rocks) reported from various parts of France (chiefly Brittany). These practices are connected in folk-thought with marriage, fecundity, etc. The author terms them "*pre*-megalithic," because, in all probability, natural stones and rocks served these purposes before menhir or dolmens were erected.

—— Contes et légendes de la Haute-Bretagne. (Ibid., 119–151.) This section contains: The Sun's Marriage, The Ball of Fire, The Old Soldier, The Devil's Daughter, and The Four Wishes.

—— Les pierres branlantes. (Ibid., 178–180.) Brief account of "rocking-stones" and their distribution in France, legends as to their origin, etc.

Semkowicz (W.) Krakowiaki. (Wisła, Warszawa, 1901, XV, 202–204.) Gives 29 specimens from the village of Łęki (district of Brzesć) of Cracovian songs.

Smólski (G.) O Kaszubach nadłebianskich. (Ibid., 153–172.) A general account, with many references to the literature of the subject, of the Kassubes in the region of the Leba in northeastern Pomerania.

Sterling (P.) Przyczynek do badán nad początkiem kultu silnych. (Ibid., 173–176.) General discussion of the origin of the "cult of the strong."

Stieda (L.) Anatomisches über alt-italische Weihgeschenke. (Bonnet-Merkels Anat. Hefte, Wiesbaden, 1901, XVI, 1–83.) Treats of *donaria* or votive-gifts from the old temple of Æsculapius in Rome, from Veii, Cività Lavinia, Cività Castellana, etc., and also from a sanctuary of Diana in Nemi. These *donaria* are generally of reddish clay (sometimes painted) and consist of heads, half heads, eyes, ears, noses, lips, hands, feet, breasts, and organs of the abdomen, etc. They are representations of

Stieda—*Continued.*
healthy parts of the body, for the worshipper took care not to lay before the gods a diseased or deformed organ, lest their will might conform to that. As these clay objects are the work of ignorant artisans largely, they reveal no great anatomical knowledge. The article is illustrated with 4 plates containing 28 figures.

Swiney (F.) An ethical birth rate. (Westm. Rev., London, 1901, 550–553.) Discusses present birth statistics in England, and evidence of degeneracy in the youthful part of the population. Argues for making woman "not a race-producer but a race-developer." The "ethical birth rate" is four children per mother at intervals of six years between successive births.

Szombathy (J.) Un crâne de la race de Cro-Magnon trouvé en Moravie. (Anthropologie, Paris, 1901, XII, 150–157.) Paper read at Congress of 1900. Describes, with three text-figures and detailed table of measurements, a cranium from Fürst Johanns Höhle, near Lautsch in Moravia, which seems to prove the existence of the race of Cro-Magnon in central Europe in prehistoric times. The cranium, belonging to an individual of about 20 years of age, presents, with the exception of the high parietal bones of the skull of the old man in the Museum of Paris, all the characteristics of the Cro-Magnon type. If this find in Moravia is, as it seems to be, Quaternary, the antiquity of the race of Cro-Magnon itself is increased. In the discussion of the paper M. Verneau emphasized the great importance of this discovery.

Tetzner (F.) Das bosnische und herzegowinische Haus. (Globus, Braunschweig, 1901, LXXIX, 220–224.) This article, with thirteen text-figures, is based upon the larger work of Dr R. Meringer on the folk-house in Bosnia and Herzegovina. This region of Europe possesses houses of a remarkably primitive type,—cave-dwellings, pile-dwellings, one-roomed buildings, etc., and is of great interest to the sociologist.

—— Klete und Swirne. (Ibid., 252–255.) An historical-linguistic study (with five text-figures) of the Slavonic words *klete*, "granary," and *swirne*, a large sort of *klete* with "girls' room" and rooms for other groups of the population.

Thieullen (A.) Les pierres-figures à retouches intentionnelles à l'époque du creusement des valles. (Anthropologie, Paris, 1901, XII, 108–110.) Abstract of paper read at Congress of 1900. Treats of stones from the diluvian age suggesting certain animal figures which primitive man "retouched." The author certainly sees more in these specimens than the man of the drift ever could. In the discussion following, Sir John Evans and Professor Montelius expressed themselves as unconvinced, while the Abbé Breuil seemed more favorably disposed.

Thiot (L.) Notice sur la station préhistorique de Montmille, Oise. (Bull. et Mem. Soc. d'Anthrop. de Paris, 1900, V^e^ s., I, 440–446.) Describes briefly, with five text-figures, the early neolithic station of Montmille, in the department of Oise, the implements, etc., found there. The station belonged to a people acquainted with agriculture, and yet devoted to the chase.

Thomas (N. W.) Horses' heads, weather-cocks, etc. (Folk-Lore, London, 1900, XI, 322–323.) Brief notes, illustrated by four plates (28 figs.) from Petersen's work on the horses' heads on the gables of German houses, with reference to literature.

Vauvillé (O.) Puits néolithique pour l'extraction du silex sur Froucourt, commune, de Saint-Romain, Somme. (Bull. et Mém. Soc. d'Anthrop. de Paris, 1900, V^e^ s., I, 483–485.) Brief account, with one cut, of a circular "well" or excavation at Frocourt examined in 1899, in which were discovered some relics (charred wood, pottery, etc.) of the neolithic period. This "well" and perhaps other similar excavations in this region seem to have been made for the extraction of flint.

Verneau (R.) and **de Villeneuve** (L.) La grotte des Bas-Moulins. Anthropologie, Paris, 1901, XII, 1–27.) Detailed account, with two plates and six text-figures, of the finds (ossuary, etc.) of 1898 in the Bas-Moulins grotto at Monte Carlo. The explorations were made by M. l'Abbé Janin, at the expense of the Prince of Monaco. The caves themselves, the burials, implements, and art remains, fauna, human

Verneau—*Continued.*
remains (portions of some 60 skeletons), are treated of. The skeletons indicate that these neolithic people were of a stature considerably lower than the average, brachycephalic generally, and not very robust. The brachycephalic crania of Bas-Moulins seem to resemble the Furfooz type No. 2, while the dolichocephalic skull recalls the Cro-Magnon,—this indicates a heterogeneous population probably related to the Ligurians.

Vetter (A.) Schwäbische Beiträge zu Blümml und Rott, Verwendung der Pflanzen. (Ztschr. d. Ver. f. Volkskunde, Berlin, 1901, XI, 224–226.) Gives additional examples from Swabia of the use of plants by children,—in all seventeen items.

de Villeneuve (L.) See Vauvillé (O.)

Volkov (T.) Défense du mammouth gravée du gisement paléolithique de Kiev. (Bull. et. Mém. Soc. d'Anthrop. de Paris, 1900, V^e^ s., I, 478–479.) The author expresses the opinion that the carved mammoth-tusk discovered in 1898 by Khvoïka in a paléolithic situs in Kiev is "really a specimen of art of the Magdalène type." This relic proves not only the existence of Magdalenian art, but also that since the reindeer did not yet exist in this part of Russia, art served itself with the mammoth-tusk at an age when, in France, the horns of the reindeer were employed for like purposes.

Vorobjev (V. V.) O sootnoshenii mezhdu glavnêishimi razmêrami golovwî i litza tchelovêka i yego rostom. (Russk. Antrop. Zhur, Moskva, 1900, I, No. III, 83–99.) Gives, with three tables and six diagrams, the results of the investigation of 212 individuals from the Government of Rjäsan and 232 others (workmen) from the Government of Moscow, with respect to the relation between the chief head and face measurements and those of stature. The author refers in comparison to the studies of Anutchin, Erismann, Rozhdestvensky, etc., the last somewhat in detail. The most interesting general conclusion attained is that tall individuals possess a head smaller in all its principal measurements, the head growing more slowly than the stature in every way. The head measurements seem to increase with stature less than the measurements of the face.

—— Velikorussii. (Ibid., No. I, 43–82.) An anthropological sketch of the "Great Russians," with bibliography (pp. 80–82), and six text-illustrations of types. Stature, form of head and face, etc., are considered.

Wateff (S.) Anthropologische Beobachtungen an den Schülern und Soldaten in Bulgarien. (Corrbl. d. deutschen Ges. f. Anthrop., München, 1901, XXXII, 29–30.) Brief résumé of the results of the investigation of the color of skin, hair, and eyes of Bulgarian school children and soldiers by the Commission of 1896, which has undertaken to secure data for a monograph on the anthropology of Bavaria. The statistics are grouped after the Virchow model. Altogether 209,929 children 6–10 years of age, 20,810 children 10–15 years of age, 6,145 children 15–20 years of age from all grades of the schools (total 236,884 out of 258,368 school-children in all), and 31,469 (out of 35,000 in all) soldiers 20–25 years of age, were examined. Besides this the army-physicians took detailed anthropological measurements of 5,000 soldiers. Of the total number of children and soldiers examined 9.12% were blond, 47.39% brunette, and 43.49% of mixed type; the highest percentage of any one characteristic was white skin 64.74 (next to this brown eyes 59.76), the lowest, red hair 0.08 (next to this green eyes 0.67). The highest percentage of blonds for five-year periods of age was 9.94 at 6–10 years, the lowest 4.65 at 15–20 years; of brunettes 60.97 at 15–20 years, and 45.98 at 6–10 years; of the mixed type 45.47 at 20–25 years, and 34.38 at 15–20 years.

Weinhold (K.) Der Palmbusch in den Niederlanden. (Ztschr. d. Ver. f. Volkskunde, Berlin, 1901, XI, 215–216.) Brief abstract of the literature of the subject.

—— Wochenzettel für den kärntischen Bauerntisch. (Ibid., 221–226.) Gives the peasants' bill of fare from Stockenboj.

Wennersten (O. V.) Gotlands fårmärken. (Medd. fr. Nord. Mus., Stockholm, 1898 [1900], 59–62.) Describes, with two text-figures, the sheep-marks in use in the Swedish province of Gothland, where oviculture has flourished since the fourteenth century. Hitherto sheep-marks have been reported from Iceland only.

Wiklund (K. B.) Om lapparnas sätt att hälsa. (Ibid., 39–48.) Discussion, with review of literature of the subject of formulæ of greeting in use among the Lapps. Widespread among the Swedish Lapps are certain corruptions of "god natt" (good night). Equivalents of our English "farewell" among both Lapps and Finns.

Wilke (Dr) Ein slavisches Gefäss mit Leichenbrand von Lössnig bei Strehla. (Verh. d. Berl. Ges. f. Anthrop., 1901, 39–43.) Discusses, with two text-figures, an earthen pot, noteworthy on account of having been made, apparently, without a lathe, and containing evidence of burial by incineration. If the remains are really Slavonic, the custom was probably borrowed from the surrounding Teutonic population.

Willame (G.) Les festins du tir de l'oiseau à Nivelles, Brabant. (Wallonia, Liège, 1901, IX, 84–87.) A brief account of the festivities in connection with the annual "shoot" at Nivelles.

Wilser (L.) Die Häuptlingsstäbe, bâtons de commandement. (Globus, Braunschweig, 1901, LXXIX, 80.) Abstract, with reproduction of illustrations, of the paper of Dr Schoetensack.

Witowt. Kilka przesądów ze wsi Turowa. (Wisła, Warszawa, 1901, XV, 177–183.) Alphabetical list of 111 items of folk-lore from the village of Turowa, district of Radzyń.

Zaborowski (M.) Industrie égéenne ou prémycénienne sur le Dniestre et le Dniepre. (Bull. et Mém. Soc. d' Anthrop. de Paris, 1900, V^e^ s., I, 451–456.) Brief résumé of recent investigations in the Dniester and Dnieper regions in Russia, where remains of the premycenian or Ægean culture have been found,—some 30 places in all have been noted (Horodnica, Bilcze Zlote, the cave of Werteba, Zielencze,— a neolithic village,—etc.) Zielencze, the author thinks, is "synchronous with the oldest Ægean civilization." The painted pottery of the Dniester—Dnieper region "proves indisputably the existence of commercial relations (maritime, fluvial) between that part of the world and the eastern Mediterranean, at an epoch when its indigenous population were still in the stone age and without intercourse with the more civilized peoples of Asia and Europe."

—— Crânes de kourganes préhistoriques, scythiques, drewlanes et polanes. (Ibid., 456–465.) Résumés, after Talko-Hryncenicz, the prehistoric and protohistoric craniology of the lower Dnieper region,—the people of the *kourgans* of the Ukraine. The measurements relate to 150 crania belonging to different periods. The author considers that these investigations confirm his own studies in virtue of which he recognized the dolichocephalic skulls as belonging to the oldest population, while the brachycephalic minority represented a later, foreign element, coincident with the arrival of metals, etc. The *Drewlanes* ("forest people") and Polanes ("plains peoples") were either Slavonic peoples or peoples who were Slavonicized at a very early period.

—— Le feu sacré et le culte du foyer chez les Slaves contemporains. (Ibid., 530–534.) After a few notes on fire-lore among the Hindus, Greeks, and Romans, the Ainos, Ossetes, etc., the author résumés Titelbach's brief article in the *Internationales Archiv f. Ethnographie*, 1900, XIII.

Zeller (G.) Bäuerliche Kraftspiele am Abersee. (Ztschr. d. Ver. f. Volkskunde, Berlin, 1901, XI, 218–219.) Brief account of two remarkable games of physical strength ("rotten muscles" and "wood-splitting") in vogue among the peasants of the Abersee in Salzburg.

AFRICA

Andree (R.) Alte westafrikanische Elfenbeinschnitzwerke im Herzogl. Museum zu Braunschweig. (Globus, Braunschweig, 1901, LXXIX, 156–159.) Describes, with seven text-illustrations, a drinking-vessel, a horn, and four spoons, all carved in ivory. They probably came from old Benin, at the time when it was famous for such objects of art, and came into the possession of the Dukes of Brunswick late in the seventeenth or early in the eighteenth century, being transferred to the Museum later.

Calvert (F.) Ein neolithisches Skelet aus Ober-Aegypten. (Verh. d. Berl. Ges. f. Anthrop., 1901, 33–34.) Cites extract from *Daily Graphic* (London) of Nov. 22, 1900, containing brief notice of a skeleton found in a sandstone grave on the west bank of the Nile.

Girard (H.) Yakomas et Bougous, anthropophages du Haut-Oubanghi. (Anthropologie, Paris, 1901, XII, 51–92.) This interesting paper contains valuable anthropometric (3 pages of measurements of 30 Yakomas and 4 Bougous, besides data in text) and ethnographical (including a Yakoma vocabulary of some 150 words) details concerning the Yakomas and Bugus, two little-known negro peoples of the Upper Ubanghi, a tributary of the Congo from the northeast. The Yakomas appear to be small-statured, mesaticephalic (rather brachycephalic), the Bugus rather tall and dolichocephalic. The relations between stature and cephalic index among the Yakomas indicate a mixture of races, a duality of cephalic index among these small negroes, as Verneau maintained. Both tribes are cannibals, the custom being largely due, Dr Girard thinks, to gluttony. They are not so grossly fetishistic as the Coast negroes. In their mimic dances the sexes do not mingle. Adultery is said to be rare. These negroes are gay, affable, and easy to govern if the right way be taken.

Gorilla (Der) im Kamerungebiete. (Globus, Braunschweig, 1901, LXXIX, 147–148.) Brief description, with measurements and photograph, of the largest gorilla hitherto discovered (killed by H. Paschen in April 1900), and now in the Umlauff Museum in Hamburg. The height of the skeleton was 165 cm. (arm-stretch 280 cm.), and the cranial capacity 56.2 ccm.

Hartmann (A.) Der Göttersitz Nanganga und seine Zerstörung. (Ibid., 201–202.) Brief description of the holy-place of Nanganga (its priesthood and ceremonies) destroyed by the missionaries in 1899. Nanganga was situated on the eastern shore of Lake Tanganjika.

Hollis (A. C.) Notes on the history of Vumba, East Africa. (Journ. Anthrop. Inst., Lond., 1900, XXX, 275–298.) An interesting résumé of the history, as obtained from various aged informants, of Vumba (the chieftains of which began their rule in the thirteenth century A.D.) down to the present time, with an account of the *diwans* or rulers. The paper is accompanied by three maps and a pedigree of the *diwans* of Vumba. A mass of genealogical information, not printed here, is accessible in the library of the Institute.

Jacquot (L.) Légendes sahariennes. (Rev. d. Trad. Pop., Paris, 1901, XVI, 265–267.) Six very brief legends from the Algerian Sahara.

K. (R. T.) Unter den Fellachen Gosens. (Globus, Braunschweig, 1901, LXXIX, 105–108.) Brief account, with 6 text-figures, of a journey among the Fellahin of the province of Sharkiyeh, the Land of Goshen of the Bible. Markets, water-places, religion, marriage, harvesting, etc., are referred to. The author notes the robust forms of the Fellahin, the droll babies, the early marriages, etc.

Leue (A.) Uha. (Ibid., 53–55, 76–78, 92–94.) This account of the Uha country in German East Africa, contains notes on the Waha, a Bantu people, the chief Mtale and his villages, the kingdom of Kihitia, etc.

von Luschan (F.) Zur anthropologischen Stellung der alten Ägypter. (Ibid., 196–200.) Discusses, with 10 text-figures, some aspects of comparative Egyptology. The oldest statues (from Negadeh, recently described by Naville) have a penis-cover like that of the Mobo in northern Togo, rather than the *nutschi* of the Kaffirs. Dr von Luschan does not favor Naville's new attempt to connect the ancient Egyptians with the Bantu tribes, holding to the theory of Semitic relationship, as evidenced by language.

de Mortillet (A.) La circoncision en Tunisie. (Bull. et Mem. Soc. d'Anthrop. de Paris, 1900, V^e^ S., I, 538–543.) Describes (with two figures), after Dr A. Loir, the practice of circumcision among the Jews and Mussulmans of Tunis. With the two peoples, method, rite, ceremonial, etc., are different, and while the former circumcise at eight days after birth, the latter do so only at about the sixth year (except that when the elder brother is circumcised, all his brothers two years of age or over have to submit to the operation). Suction of the wound still survives among the Tunisian Jews, but has been abandoned in France and England, and is prohibited in Germany. Its abolition is now being sought in Tunis.

Müller (P. F.) Folkloristische Ewhetexte, Gē-Dialekt. (Globus, Braunschweig, 1900, LXXIX, 45–46.) Native text with interlinear German and (in most cases) free English translation of folk-lore items about the moon, the stars, the origin of the firmament, and the silly character of the people of old. Numerous explanatory notes are also given. The last item is Abderite enough–"Of old the people were so silly that if a fly alighted upon their body, they would take up a gun to shoot it off." The author is a missionary in the Togo country.

Ponyaud (A.) Aperçu ethnographique sur la Tunisie. (Bull. Soc. Amis d. Sci. et Arts de Rochechouart, 1900, X, 67–71.) Concluding portion of notes on Tunisian ethnography. The author observes that unity of civilization (all Tunisian peoples aboriginal and foreign, except the Jews, have adopted Islam) has not yet involved unity of race.

Seidel (H.) Neue Forschungen und Fortschritte auf Madagaskar. (Globus, Braunschweig, 1901, LXXIX, 55–63.) This article, with nine illustrations, treats of recent progress in Madagascar under the rule of General Gallieni, and contains notes on the Antanossy (the aborigines of the Mahalfy region), the Tanals (evidently possessing some Hova blood) and the Betsimisaraka (originally pure African).

Weeks (J. H.) Stories and other notes from the Upper Congo. (Folk-Lore, London, 1901, XII, 181–189.) Gives English text of two tales ("Concerning a Person,"—telling why women run away and how people became liars; "Concerning the Owl and the Partridge,"—telling why people are afraid of spirits), and notes about charms, *likundu* (or occult power), ordeals, drinking customs. Worthy of note is the custom of giving away the first fruits of one's skill in manufacture, farming, hunting, fishing, etc. In this part of the world when a man becomes drunk, "he sticks a leaf in his hair to show it, and then no notice is taken of any stupid or insulting remark he may make, or any business transactions he may enter upon." Some of the material of this interesting article, with other like matter, has been printed in a primer used in the mission school of the Monsembe Station.

ASIA

Aristov (N. A.) Etnitcheskiya otnosheniya na Pamirê i vŭ prilegayustchichŭ stranachŭ po drevnimŭ, preimutschestvenno kitaĭskimŭ, istoritcheskimŭ izvêstigamŭ. (Russk. Antrop. Zhur., Moskva, 1900, I, No. III, 1–74.) A valuable study, with abundant references to the modern literature of the subject, of the ethnology of the Pamir and the adjoining regions, after the data in ancient Chinese annals. The oldest inhabitants of the region of Pamir and Kashgar seem to have been a people closely related to the Tibetans, and they continued to possess it until about the first century B.C.

Barth (A.) Un ancien manuel de sorcellerie hindone. (Mélusine, Paris, 1901, X, 171–176.) Critical review of Caland's translation of the *Kauçika Sûtra*,— there is a previous edition by Prof. Bloomfield of Baltimore.

Basset (R.) Notes sur les Mille et une nuits. Rev. d. Trad. Pop., Paris, 1901, XVI, 74–88.) This section of M. Basset's critical and bibliographical study treats of the tale of "The Sleeper Awakened." The first part of the story, the author thinks, is an elaboration of the "If I were king" theme; the second (absolutely independent of the first) is probably based upon a real incident in the life of Abu Dolâmah.

—— Contes et légendes Arabes. (Ibid., 108–109, 165–177, 240–250.) Nos. DVIII–DXLIX of brief Arab tales and legends of all sorts. French text with bibliographical notes.

Butler (H. C.) Report of an American archæological expedition in Syria, 1899–1900. (Amer. Jour. Archæol., Norwood, Mass., 1900, IV, 415–440.) Treats of investigations in the mountain divisions of northern central Syria, in continuation of the researches of de Vogüé, 1861–1862. Sculpture, architecture, inscriptions (Greek, Latin Syriac, Hebrew, Palmyræan, Nabatæan, Safaïtic, Kufic,—Arabic,—) are referred to. Some of the *graffiti* found are of unusual importance. The full results of the expedition will shortly be published. The material is to be stored at Princeton University.

Carus (P.) Seven. (Open Court, Chicago, 1901, XV, 335–340.) First part of an illustrated discussion of the sacred number seven in relation to the religion and mythology of Chaldea, Egypt, Palestine, etc.

—— The Babylonian and Hebrew views of man's fate after death. (Ibid, 346–366.) General account with numerous citations from Hebrew and Babylonian writings and records. The author attributes the absence of a cult of immortality in the Old Testament to the redactors of the Hebrew canon, who, "since the belief in immortality, as expressed in the Assyrio-Babylonian legends, cannot easily be extracted from the Babylonian religion without retaining at the same time a good deal of the mythological elements, preferred to omit the whole and embraced an attitude of positive unbelief rather than defile the Scriptures with paganism."

Crowfoot (J. W.) Survivals among the Kappadokian Kizilbash. (Journ. Anthrop. Inst., Lond., 1900, XXX, 305–330.) This paper, accompanied by a map, two plates of portraits, and tables of cephalic measurements of 15 subjects, treats of the Bektash or Kizilbash ("Red Heads") of two villages in the province of Angora, a pre-Osmanli people, whose religion and marriage customs in particular show many survivals from the pre-Islamic period. Indeed Kappadokia now contains many fragments of a pre-Islamic civilization; these people were *sui generis* before the time of Alexander, and Greek, Persian, and Islamic culture have all failed to change them completely.

Evans (A. J.) Mycenæan Cyprus as illustrated in the British Museum excavations. (Jour. Anthrop. Inst., Lond., 1900, XXX, 199–220.) This paper, illustrated with fourteen text figures, deals with the results of the Turner Bequest excavation in Cyprus, which have made possible for the first time "a clear insight into a distinct and highly important phase of the insular civilization." According to the author the impress of the Ægean element is so strong "that we find ourselves in presence not of sporadic influences or isolated importations of objects, but of a distinct period in the insular civilization to which the name Cypro-Mycenæan must henceforward be given." In Cyprus the Mycenæan civilization survives to a later period than in Greece proper.

Frederichsen (M.) Professor Futterers Reise durch Asien. (Globus, Braunschweig, 1901, LXXIX, 188–194.) This article, illustrated with eight text figures, contains some notes (pp. 192–194) on the Tangut, a people of northeastern Tibet,—the Amdo, as they call themselves, Tangut being their Mongol name.

Furness (W. H.) See Hiller (H. M.)

Gardiner (J. S.) The natives of the Maldives. (Proc. Cambridge Philos. Soc., 1900–1901, XI, 18–21.) Brief geographical-ethnographical sketch. The author holds that the Singhalese and the natives of the Maldives "seem to have been the result of a dichotomous branching of a common stem, one division perhaps travelling along the west coast of Hindustan to Ceylon and the other sailing through the Laccadives to the Maldives,"—the Maldivian tongue appears to be related to ancient Singhalese. In historical times there has been "comparatively little admixture of races" in the Maldives. The people of the northern atolls "approximate closely to the Mahommedans of the south-west of the Peninsula"; in the central group Caucasian, Malay, and Negro elements are recognizable; in other parts, the people "very closely resemble village Singhalese." At the beginning of the thirteenth century the Maldives are said to have been converted to Islam, but both Christianity and Buddhism have also left traces. The Maldivians "have no stories of the origin of their race nor islands." An outrigged boat, found on one of the islands, "is now only used by the children as a toy, but formerly it was in common use for inter-atoll voyages." The term *faranje*, now applied to all western peoples, keeps green the memory of the French. The Maldivian language enjoys the honor of furnishing English with the word *atoll*. According to Mr Gardiner *atolu* in Maldivian signifies "province," and "these provinces are often conterminous with the *atolls*, whence arose this term."

Hiller (H. M.) *and* **Furness** (W. H.) Notes of a trip to the Veddahs of Ceylon. (Bull. Free Mus. of Sci. and

Hiller *and* Furness—*Continued.*
Art, Phila., 1901, III, 69–87.) Brief account, illustrated with thirteen plates of a flying visit to the aborigines of the *Bintenne* region of the Badulla-Nilgalla hills and a part of the east coast of the island,—"village Veddahs" and "rock Veddahs." The photographs rather belie the statement on page 78, "the most impressive thing about them was their inhuman apathy and lack of interest, a peculiarity of the lowest types of man." The features of the Veddahs, the authors thought, "are decidedly more Hindoo than Negroid or Mongoloid." Brief notes on physical characteristics, food, clothing, primitive industries, bows and arrows, fire-making, religion, dancing, are given. There are also some notes on the Singhalese, whose votive offerings at the time of the harvest festival are represented in one of the plates. The figure of a village Veddah boy opposite page 82 is significant, while the family group on plate 14 is of great interest. It is a curious fact that these primitive people, while acquainted with the fire-drill, also use matches. There are other instances of the effect of contact with civilization, such as the Buddhist charm-book in the house of the chief at Makulugulla, etc.

Ivanowski (A.) Yezidî. (Russk. Anthrop. Zhur., Moskva, 1900, I, No. III, 100–103.) A brief anthropological sketch (after Gorostchenko, etc.) of the Yezidis, a people of Kurdistan, who are probably Kurds, in spite of their present religious tenets. On page 101 are given the average measurements of seven children (10–11 years) and 33 adults (16–65 years), belonging to the Government of Eriwan. Although the Yezidis speak a Kurdish dialect, they have a theocracy and a caste system, unknown to the Kurds proper. They also deform the head of the new-born child by binding. They are mesocephalic with an average stature of 1633 mm.

ten Kate (H.) Eine japanische Rachepuppe. (Globus, Braunschweig, 1901, LXXIX, 109–110.) Brief note, with figure, on a "witch doll" from Japan.

Laufer (B.) Felszeichnungen vom Ussuri. (Ibid., 69–72.) Treats, with fifteen figures, of the petroglyphs on the banks of the Ussuri, a tributary of the Amur, of which an account was given in 1896 by their discoverer, Lieut. Alftan, in comparison with those discovered by the author on the Amur (see *American Anthropologist*, 1899, N. S., I, 746–750).

Marnet (M.) Les castes dans l'Inde. (Bull. Soc. Amis d. Sci. et Arts de Rochechouart, 1900, X, 73–77.) First part of general discussion. Author holds that a caste-system or the beginnings of one can be noted among all peoples of Aryan stock.

Martin (W. A. P.) Poetry of the Chinese. (N. Am. Review, N. Y., 1901, CLXXII, 853–862.) General account, with specimens in English rendering.

Myres (J. L.) A primitive figurine from Adalia. (Jour. Anthrop. Inst., Lond., 1900, XXX, 251–256. Describes (with plate) a female figure in black clay, closely resembling that of the earliest Hissarlik pottery, obtained in 1900 from Adalia in Asia Minor. The position of the figure is half sitting, half kneeling, with steatopygia. It may be compared with the "temple boy" attitude of votive sculptures on Cypriote sanctuary sites. The author assigns the specimen "close to the boundary between the latest Neolithic and the earliest Metallic Age," and concludes that it resembles closely the relics of "the phase of culture represented by the lowest settlement of Hissarlik.

Nikolskj (D. P.) O tchuktchachŭ Kolymskago okruga. (Russk. Antrop. Zhur., Moskva, 1900, I, No. II, 23–29.) brief account, after Bogoras, of the Tchukchi of the region of Kolymsk. See *American Anthropologist*, 1901, N. S., III, 80–108.

Ozaki (Y.) Yubana, die Heisswasserprobe in Japan. (Globus, Braunschweig, 1901, LXXIX, 128–131.) Brief account, illustrated with eight text-figures, of the half-yearly "Shinto miracle," the Yubana, or "hot-water ordeal," as performed in the Houshi Shinshukyo temple in the Kanda district of Tokio. The author inclines to the belief that "suggestion and thick skin" count for much in this ordeal.

Pelletier (Madelaine) Recherches sur les indices pondéraux du crâne et des principaux os longs d'une série de

Pelletier—*Continued.*
squelettes japonais. (Bull. et Mém. Soc. d'Anthrop de Paris, 1900, Ve s., I, 514–529.) Gives, with detailed statistics, the results of observation of 55 skeletons (from Set tsu, Isumi, Izi Jamachiri) belonging to the Stenackers collection. Cranio-femoral, cranio-mandibular, cranio-cerebral (89 skulls), humero-femoral, cnemo-crural indices, weight of crania, long-bones, etc., are considered, besides cranial capacity. Among other interesting facts the following are brought out: In skeletal development the Japanese woman is nearer the Japanese man than the two sexes of Europeans are to each other; for both sexes the cerebro-mandibular index is higher with Japanese; with the Japanese the right humerus is hardly heavier than the left; the cranial capacity of Japanese women is rather high, as is also the weight of the female femur. Some comparisons of the condition of the adolescential with the adult skeleton are also given.

Regnault (F.) Les terres-cuites de Smyrne. (Ibid., 467–477.) Brief account, with 21 text-figures, of a collection of terra-cottas (statuettes) from the ruins of Smyrna, largely house ornaments or vase-attachments, amulets, etc., and embracing a great variety of types. These interesting statuettes represent the Coroplasts of Smyrna, and besides normal attitudes and forms the grotesque and the pathological occur quite numerously. Some of the physiognomic types (a Chinaman; facial expression of pleasure, pain, etc.; facial deformations, cranial peculiarities and deformations, heads of idiots and degenerates) are evidently quite true to life. Representations of hunchbacks, pregnant women, gnomes, etc., are also found, while the figures of the sexual characteristics are often well executed. It must be remembered that Galen began his medical career in the schools of Smyrna.

Seland (N.) K' antropologii zapadno-sibirskago krest' yanina. (Russk. Antrop. Zhur., Moskva, 1900, I, No. III, 75–82.) Gives, with two tables, the results of the measurements (stature, chest-girth, head, strength of right hand) of 241 soldiers (from Tobolsk, Tomsk, Perm, Semiretchje, Orenburg) at Verniye in Turkestan, where the author is resident as a physician. The type of the West-Siberian peasants is Slavonic, and eyelids, cheek-bones, and lips of the Mongolic type were not met with. The head-measurements are treated more in detail. The average pressure-strength (right hand) of 35 individuals from Tobolsk, 60 from Tomsk, 49 from Perm, 47 from Semiretchje, and 50 from Orenburg was 47.4, 49.2, 47.7, 49.2, 48.6 respectively, that of 23 women whose measurements are also given being 32. The average stature of the women is 1581 mm., as compared with 1683, 1689, 1667, 1694, 1636 for the five groups of men.

Stadling (J.) The people at the top of the world. (Century, N. Y., 1901, LXI, 511–520, 754–762.) This account of a search for Andree in Siberia contains notes on the natives on the Taimur, Lena, etc.,—shamans, property, marriage customs.

Stenz (P.) Die Gesellschaft "vom grossen Messer," Boxer. (Globus, Braunschweig, 1901, LXXIX, 9–12.) Brief account (with reproduction of a page in colors from the "Book of Prophecy") of the now famous society of "Boxers." The author is a Catholic missionary, and the paper is of more than passing interest.

Sternberg (L.) Ueber die Giljaken. (Verh. d. Berl. Ges. f. Anthrop., 1901, 36–39.) Brief account of observations during several years' residence among the Giliaks of the Amur. The author considers the Giliaks an isolated people (by language, customs, etc.) with possibly American affinities,—they are certainly of northern origin. They seem to be "almost one with the Aleuts." Among the 4,500 Giliaks, there exist two principal dialects, divided into five or six lesser ones. The physical features of these people have changed more than their mental characteristics. Beneath a somewhat stolid face the Giliaks hide a rather merry and sociable nature,—their women are even acquainted with coquetry.

Talko-Gryntzevitsch (Y. D.) Drevnie obitateli Tzentral'noi Azii. (Russk. Antrop. Zhur., Moskva, 1900, I, No. II, 1–11.) A brief ethnological sketch of the ancient peoples of central Asia, Turko-Tatars and Mongols, who came into contact with Shamanism, Islam, Buddhism, Christianity, and underwent

Talko-Gryntzevitsch—*Continued.*
not only physical but also linguistic intermixture, so that now one finds even a Turkic people with Mongolian speech and Hindu religion. The evidence cited by the author comes from the investigations of burial-places and the accounts in Chinese annals.

Venkataswami (M. N.). Hindu notes. (Folk-Lore, London, 1900, XI, 218–219.) Brief items about monkeys, childhood marriage.

Zaborowski (M.) Mensurations des Tonkinois. Les dolichocéphales Chinois de l' Indo-Chine. Crânes Tonkinois et Annamites. (Bull. et Mém. Soc. d' Anthrop. de Paris, 1900, V^e^ s., I, 319–328.) After a brief résumé of the work and opinions of Girard (who took measurements of some 2,000 subjects), Eitel (studies of the Hakkas), Piton, etc., and some ethnographic details, the author gives the measurements of an old Tonkinese skull, those of the skull of an Annamese mandarin from Tonkin after Néïs, of three Annamese after Mondière, one after Vinson, and one after d'Enjoy. It has been thought that there is in China an ancient Eskimo element, like the Tungus, whose analogues, however, are to be sought among the ancient people of the Baïkal region, or the Turko-Tatars, rather than among the Eskimo. There is considerable evidence now to indicate a prevailing dolichocephaly for a large part of the ancient population of China. The Annamites show traces of mixture with the dolichocephalic Moïs, whom they dispossessed, and there is evidence also of the presence of a sub-Caucasian type in this region.

—— La Chine et les chinois. (Ibid. 544–560.) This paper has appeared also in the *Revue Scientifique* 1901, 4^e^ s., XV, 161–170. See *American Anthropologist*, 1901, N. S. III, 189.

Zachariae (T.) Zu Goethe's Parialegende. (Ztschr. d. Ver. f. Volkskunde, Berlin, 1901, XI, 186–192.) A discussion, with bibliographical references, of Goethe's Paria-legend poem, which is based upon the story of Marlatale, a goddess of southern India. Goethe became acquainted with the legend from Sonnerat's book of Oriental travels published in 1783 in German.

INDONESIA, AUSTRALASIA, POLYNESIA.

Blumentritt (F.) List of the native tribes of the Philippines and of the languages spoken by them. (Ann. Rep. Smithson. Inst., Washington, 1899 [1901], 527–547.) Translated (with introduction and notes) by Prof. O. T. Mason from the Zeitschrift der Gesellschaft für Erdkunde zu Berlin for 1890. The article is illustrated with a colored map reproduced from the Boletín de la Sociedad Geográfica de Madrid for 1890 and with ten plates representing natives of the islands from the Hilder collection of the Bureau of American Ethnology.

Bouchal (L.) Bezoarsteine in Indonesien. (Mitth. d. Anthrop. Ges. in Wien, 1900, XXX, N. F. X, 179–180.) Brief references, with etymologies of native names, to bezoar-stones among Indonesian peoples. The term *ulâwu* or *kulâu*, with its connections, is cited from the dictionary of the Macassar language. Some *kulâus* are believed to keep old men alive, others to be of great virtue for the coïtus. The list of *kulâu* substances (not of all which can be called bezoars) is quite long.

—— Noch einige Belegstellen für Geophagie in Indonesien. (Ibid., 180–181.) Notes the occurrence of geophagy or earth-eating in New Caledonia, Nusalaut, Saparua, Ambona, Java, and Sumatra. Among the names for edible earth in Malay languages are *batu*, *poan*, *ampo*, (*tano*) *bange*, etc. In small quantities this earth seems to have medicinal or even nutritive properties, especially with women and children.

Chamberlain (A. F.) Philippine studies. IV. Father Kamel and his writings. (Amer. Antiq., Chicago, 1901, XXIII, 203–206.) Notes on the papers about the Philippines (fauna, flora, monstrosities, etc.) of Father G. J. Camel, a Jesuit from Moravia, resident in the archipelago in the latter part of the seventeenth century. After him the botanical genus *Camellia* is named.

Erdweg (J.) Ein Besuch bei den Varópu. (Globus, Braunschweig, 1901, LXXIX, 101–105.) Brief ethnographical sketch of the Varópu, of German New Guinea, a fisher-folk; also a list of 67 Varópu words and phrases besides a compara-

Erdweg—*Continued.*
tive vocabulary of 39 words in seven other languages of the country. The great hospitality of the Varópu is noted. The stately forms of both men and women distinguish them from their neighbors.

Foy (W.) Zur Ethnographie von Neu-Pommern. (Ibid., 47.) Brief résumé of recent literature.

Fraser (J.) Some Indian words of relationship used by the Australian tribes. (Amer. Antiq., Chicago, 1901, XXIII, 171–178.) In this second section of his paper the author discusses the philological, anthropological, and ethnological bearings of his theory of the existence of Indian (Hindustan) relationship-words in the speech of certain Australian aborigines, and that "a simple monosyllable *ka*, having a very simple meaning, viz.: 'with,' has spread itself from the banks of the Tiber to Samoa and Japan in the far east, and has given birth to very many derivatives by a simple modification of its original form or by simple accretions." According to Dr Fraser the Malays are "not the progenitors of the Polynesians, much less of the Australians."

Haddon (A. C.) A classification of the stone clubs of British New Guinea. (Journ. Anthrop. Inst., Lond., 1900, XXX, 221–250.) In order of simplicity Prof. Haddon classifies: Natural (or only slightly worked), ring, ball, ovoid, disc, flat (with notched edges), knobbed, pickaxe, and star-clubs. Of the disc and star and knobbed (particularly) there are many varieties. The study is based on the Ballentine collection at Pt. Moresby. The descriptive portion of the paper is followed by notes on the geographical distribution of stone clubs in New Guinea, some half dozen areas being distinguished. Two sketch maps and four plates (figuring 107 clubs) accompany this valuable article. Up the Mambare river, stone clubs have been imitated in pottery.

Moir (J. P.) Stone implements from Tasmania. (Journ. Anthrop. Inst., Lond., 1900, XXX, 257–262.) This brief paper, accompanied by two plates (nineteen figures), consists of extracts from a letter relating to stone implements found in various parts of Tasmania. According to Mr Moir, gravers, scrapers, and skinners occur in about equal proportions, while axes are much fewer, and large axes very few. The author has carefully examined thousands of implements, and remarks the absence of stones made to fit or use in a club or handle,—"every implement is made to fit the hand."

Mason (O. T.) See: Blumentritt (F.), Virchow (R.)

Krämer (A.) Der Purgierfisch der Gilbertinseln. (Globus, Braunschweig, 1901, LXXIX, 181–183.) This article interests the anthropologist by reason of the peculiar fishhook figured on page 182.

Parkinson (R.) Die Einwohner der Insel St. Matthias, Bismarck-Archipel. (Globus, Braunschweig, 1901, LXXIX, 229–233.) Brief ethnological sketch,—physical characteristics, dress and ornament, houses and utensils, food, industries, weapons (figures of 12 spears are given). The spears seem to be the highest artistic products of the natives, who possess no iron.

Pleyte (C. M.) Die Mentawei-Inseln und ihre Bewohner. (Ibid., 1–7, 24–32.) This well-illustrated (10 cuts from photos) article deals with the geography and ethnography of the Mentawei islands off the west coast of Sumatra, whose inhabitants are Malayo-Polynesians of a rather individual type. Among the topics briefly discussed are: Legends, names, language, food, dress and ornament, houses, hunting and fishing, agriculture, war, birth, teeth-filing, tattooing, wooing and marriage, death and burial, religion, cultus, priests, punän (*tabu*), oracles, administration, law and crime, music and dance, chronology, etc. The absence of betel-chewing and the existence of fishing with the bow and arrow deserve mention here. Real war also is unknown, only treacherous surprises of the Malay sort. The archery of these people is good, and they use Morse's secondary release. A sub-form of the *couvade* appears to prevail. Tattooing is a prerequisite for marriage,—women are less tattooed than men. Monogamy is the general practice; the chiefs, however, have sometimes several wives. For mourning the relatives leave off (in case of children for five months, for widows

Pleyte—*Continued.*
till re-marriage) their ornaments, flowers, etc. Religion is chiefly soul-lore. There are two souls (brain, flesh), a sensitive and a vegetative one, both of which reconstitute the man in the next world. There are also evil spirits or *anitu*, and good spirits, or *bulungan*. Both sexes may be priests. *Punän*, or tabu, is an integral part of the cultus. The four crimes are: Murder, poisoning, theft, and adultery, of which the first two are punished with death, which follows for the third only after three times disregarded warning. The adulterer can be slain by the injured party.

Regnault (F.) La physionomie dans l'art sauvage. (La Nature, Paris, 1901, 408–410.) Discusses, with four figures of Polynesian war-gods, the efforts of savage peoples to render in art the human face. The author holds that primitive peoples have succeeded better than is commonly believed in representing the human physiognomy.

Stokes (J. F. G.) The mat-sails of the Pacific. (Occas. Papers, B. P. Bishop Mus., Honolulu, 1900, I, 25–32.) General account, with one plate showing board for mat-weaving, of the manufacture and use of mat-sails among the islanders of the Pacific. Mats were used for sails because *tapa* or bark cloth, the only other available material, was not durable enough. The Pacific sails are compared with those of eastern Asia, and the fact noted that "the Chinese sail has retained its shape since the first visit of the Western civilizer, until very modern times." The natives of the Marquesas islands seem to have had better sails when Mendana visited them in 1595 than in Dalrymple's time two centuries later. Imitations of European sails also occur.

Virchow (R.) The peopling of the Philippines. (Ann. Rep. Smithson. Inst., Washington, 1899 [1901], 509–529.) Translated (with notes) by Prof. O. T. Mason from the Sitzungsberichte der Königlich-Preussischen Akademie der Wissenschaften zu Berlin for 1897. Illustrated with two plates showing three skulls. The same paper appears, without the illustrations, in the Popular *Science Monthly*, 1901, LIX, 257–265; 351–360. From the cave-skulls Prof. Virchow argues for "a very old, if not autochthonous, prehistoric layer of population"—pre-Malay.

Walcott (A. M.) Ray-skin rasps. (Occas. Pap., B. P. Bishop Mus., Honolulu, 1900, I, 32–33.) Brief account, with figures of the ray-skin rasps (now substituted largely by steel) more or less common throughout the islands of the Pacific. The Gilbert islanders, *e. g.*, had various grades of them for so shaping the edges of the boards of their canoes that when sewed together they would be water-tight. Of these rasps we learn "their effectiveness when new is quite as great as that of those brought by the white man."

Walkley (C. S.) Philippine funerals. (South, Workman, Hampton, Va., 1901, XXX, 211–213.) Brief illustrated account of civilized burials at Manila.

Winkler (*Capt.*) On sea-charts used in the Marshall islands, with notices on the navigation of these islanders in general. (Ann. Rep. Smithson. Inst., Washington, 1899 [1901], 487–508.) This valuable article translated from the Marine-Rundschau (Berlin) for 1898, is illustrated with fifteen plates from U. S. National Museum and other collections.

AMERICA

Boyle (D.) The paganism of the civilized Iroquois of Ontario. (Journ. Anthrop. Inst., Lond., 1900, XXX, 263–274.) A brief account of the pagan Iroquois (1000 in number) of Grand River reserve, Ontario,—"a condition of society in which paganism openly professed and practiced has existed side by side with Christianity for nearly three hundred years." The paganism of these Iroquois has been modified very little by their Christian brethren. Conservatism has preserved, with loss of origin and meaning, "in almost their pristine simplicity and crudity, the music, the songs, the dances, the speeches, and the ceremonies of old." More about these interesting people may be read in Mr Boyle's Archæological Report for 1898, where many valuable details, fully illustrated, are given.

Brosius (S. M.) Liberty or rations for the Indians, which? (South. Workman, Hampton, Va., 1901, XXX, 299–302.) A plea for political, economic, and social freedom for the Indian.

Brosius—*Continued.*

—— The communal system among Indians. (Ibid., 194–195.) Author holds that "the need of the hour is legislation prohibiting the further enrollment of children to become beneficiaries of tribal estate."

Burns (L. M.) Digger Indian legends. (Land of Sunshine, Los Angeles, 1901, XIV, 310–314, 397–402.) These last two sections of Mr Burns' paper record "the love-making of Quatuk (Coyote)," "the Rabbit and the Toad," and "the legend of Edoochme." The tale of how Coyote took a fog for the ocean and tried to swim it "is a general favorite." In the second tale the Rabbit gets the Toad to jump into the fire and get burned,—the Toad had killed the Rabbit's love, the little green Frog. The third tale is of an abandoned child, who performed wonderful deeds. He lies now turned (by himself) into stone in the bed of Salmon river, "with his arms and legs uplifted in arches." And today "the Indian boy who can swim through without touching will never be harmed by a grizzly."

Culin (S.) A summer trip among the western Indians. (Bull. Free Mus. of Sci. and Art, Phila., 1901, III, 1–22, 88–122, 143–175.) This interesting paper, illustrated with 27 excellent plates, gives details of ethnographic and ethnologic sort obtained during a visit in the summer of 1900 to the Sacs and Foxes of Iowa, the Shoshoni and Arapaho of Wyoming, the Bannocks of Idaho, the Utes of Utah, the Piutes of Nevada, the Hupa of California, the Makah and Yakima of Washington, the Umatilla of Oregon, the Siouan Indians of Montana and North Dakota. Mr Culin notes the inroads of white civilization on the Indians and the progressive abandonment of primitive customs and industries. Many items of great anthropological and folk-lore interest are contained in these pages,—at pages 20–22 are "Notes on the Shoshoni and Arapaho" by Rev. John Roberts. The pictures of Wa-pa-lete-hihi, the Umatilla (opposite page 166), and of the Umatilla Indian girl (opposite page 164) are well worth examining. If the brush does not render the Indian at his best, the camera may.

Drew (C. A.) Signs of degeneracy and types of the criminal insane. (Amer. Journ. Insan., Baltimore, 1901, LVII 689–698.) Discusses, with ten plates, eight cases in the Massachusetts State Asylum for Insane Criminals,—cranial characteristics especially. Author takes conservative stand and thinks significance of "stigmata of degeneracy" may be exaggerated.

Dubois (W. E. B.) The problem of housing the Negro. I. The elements of the problem. (South. Workman, Hampton, Va., 1901, XXX, 390–395.) Prof. Dubois approaches the problem by a study of the Negro's "African past," giving (with illustrations) a brief account of houses and huts in the Old World negro lands.

Durham (J. S.) Race traits and general culture. (Ibid., 302–305.) Author's thesis is: "Man in his relationship [historical] is, then, the beginning and end of this general culture; and the special culture has as its beginning and end the Negro in his relationships to the extent that the race experience in this country has been peculiar." The object of Negro education is "the eradication of those undesirable traits which have been the result of race experience, and the conservation of those traits which are desirable."

Ehrenreich (P.) Religiöser Glaube der Centraleskimos. (Globus, Braunschweig, 1901, LXXIX, 44–45.) Critical review of the article of Boas.

Flores (E.) Primeros pobladores del país de Anahuac. (Bol. Inst. Cient. y Lit., Toluca, 1901, IV, 74–82.) Concluding section of an historical sketch of the ancient people of Anahuac. Treats of the period from King *Totepeuh* in 875 A.D. to *Topiltzin* (1094), under whom the Toltec nation went to pieces.

Franklin (Christine L.) Color-introspection on the part of the Eskimo. (Psychol. Rev., N. Y., VIII, 396–402.) Discusses the importance of the facts revealed by Mr Rivers in his paper on "The color-vision of the Eskimo." The acute color-consciousness of the Labrador Eskimo has revealed to them that "red, yellow, green, and blue (and no other colors) are of a unitary character," a very remarkable "coincidence of scientific color scheme with an impersonal character of color experience." See Rivers (W. H. R.)

Gleason (F. D.) Dakota children. (South. Workman, Hampton, Va., 1901, XXX, 348–352.) Illustrated popular article. Treats of infancy, travel, schooling of Sioux children of the Rosebud agency,

Guevara (T.) Historia de la civilizacion de Araucanía. (Anales de la Univ., Santiago de Chile, 1901, CVIII, 3–82.) This section of Guevara's history of the subjection of Araucanía deals with the wars with the Indians from 1561 to 1598, including the second general rising of 1594–1595. During the battles of this period the Indians showed that they had made progress in the art of fortification and had studied well the tactics of the Spaniards. The number of horses used by them increased, and they began to exhibit skill in their management. A brief account of the military tactics of the Indians is given at pages 69–72. Dr Guevara points out the imitation of Spanish tactics, the use of cavalry, armor copied from that of the Europeans, etc. They also manifested moral progress and some augmentation of prescience. To this period belongs Captain Fernando Alvarez de Toledo's *Purén Indómito*, one of the historical poems of the conquest.

Halbert (H. S.) The derivation of Mobile and Alabama. (Amer. Antiq., Chicago, 1901, XXIII, 179.) According to the author the name *Mobile* represents an archaic form (*mowelih* or *mobelih*) of the Choctaw *moelih* meaning "rowers" or "paddlers." *Alabama*, he thinks, comes from the Choctaw *alba*, "vegetation (of the lesser sort)," *amo*, "to gather," referring to the *défrichement* practised by the Indians. This etymology of Alabama does not differ in sense from that suggested by Dr A. S. Gatschet in 1888 in his "Migration Legend of the Creeks," —*alba ayalmu* "cleared thicket."

Harsha (W. J.) The pride of the Indian. (South. Workman, Hampton, Va., 1901, XXX, 264–268.) Author holds that it may be said of the Indian, "one main trait, if not the very central and moving trait, of his character is pride." This is an obstacle to converting and civilizing him, but wisely used, could lead him to higher and nobler things.

Holmes (W. H.) Review of the evidence relating to auriferous gravel man in California. (Ann. Rep. Smithson. Inst., Washington, 1899 [1901], 419–472.) This valuable article, illustrated with sixteen plates and five text figures, and critically reviewing the literature of the subject, is reprinted from the *American Anthropologist* for January and October, 1899.

Katzer (F.) Zur Ethnographie des Rio Tapajós. (Globus, Braunschweig, 1901, LXXIX, 37–41.) This article, illustrated with 13 figures (implements, head-trophies, face-tattooing), treats of the Mauhés, Mundurukús, and 'Apiakás, tribes on the Tapajós, in Brazil. A brief word-list from the Mauhé tongue and a few words of the Apiakás are given, and the author makes some corrections of Coudreau's linguistic material from this region. Some of the stone implements are described in detail. Certain polished implements are now made by the Mundurukús but "only as ornaments and children's toys," and not for use, for which purposes similar objects of the European stone age were doubtless also made.

Krause (E.) Die Schraube, eine Eskimo-Erfindung? (Ibid., 8–9.) From the consideration of the imposition of the arrowpoints in their shafts (illustrated by 7 text-figures), the author concludes that the screw has been invented by the Eskimo. See von den Steinen (K.)

Laidlaw (G. E.) Wooden relics. (Amer. Antiq., Chicago, 1901, XXIII, 169–170.) After noting the occurrence of "fish-stakes," mat-beaters, mallets, etc., the author digresses to briefly describe some pits on hills, said by local Indian (Victoria Co., Ont.) tradition to have been built by the Mohawks for defensive purposes against the Algonquian Missisagas.

Lehmann-Nitsche (R.) L'Homme fossile de la formation pampéenne. (Anthropologie, Paris, 1901, XII, 160–165.) Abstract of paper read before Congress of 1900. The finds upon which the argument rests are bits of baked clay from the middle *löss* of the Arroyo Ramallo, and Alvear,—to these a human origin is attributed. (See *American Anthropologist*, III, 195.) In the discussion M. Albert Gaudry expressed the opinion that the remains from the

Lehmann Nistche—*Continued.*
Eberhardt grotto in Patagonia belonged to a quite recent epoch, and M. Imbert observed that there was no synchronism of paleolithic evolution in South America and in Europe, the former lagging behind the latter.

Leighton (Margaret W.) The Haidah Indians. (Overland Monthly, San Francisco, 1901, XXXVII, 1083–1086.) Illustrated popular article. Totem-poles, tattooing, canoes, carving, gambling, feasts, houses, shamans, are briefly referred to. The author seems to favor an Aztec origin for these Indians, a view lacking proof.

Lewis (Frances W.) The Pueblo home, (South. Workman, Hampton, Va., 1901, XXX, 316–320.) A sympathetic popular account of the home-life of the Pueblo Indian, whose "home is on the whole a happy one."

Lummis (C. F.) A New Mexican folk-song. (Land of Sunshine, Los Angeles, 1901, XIV, 318–319.) Spanish and English text, with music, of *El Borrachito*, ("The Tipsy Fellow"), a folk-song of New Mexico, collected by Mr Lummis and arranged by the late Prof. J. C. Fillmore.

McCowan (S. M.) The story of Mahtotohpa, second chief of the Mandans. (South. Workman, Hampton, Va., 1901, XXX, 200–205.) Popular article illustrated by six drawings made by Hampton students. The picture of Mahtotohpa was painted by Catlin in 1832.

McDermott (Louisa) Indian pupils' ambitions. (Ibid., 401–405.) States results of investigations in six non-reservation boarding schools in Kansas, New Mexico, Oklahoma, Montana, and Colorado, where the pupils are "nearest to white children in culture, experience, and general knowledge of life," and where also they "speak English, are thoroughly trained in the ways of civilization, and look at life from the civilized standpoint." The statistics relate to 975 boys and 658 girls between the ages of 4 and 26. Naturally enough, it is found that "white children have the larger field of vision and higher ambitions," since these are largely school-suggested. Like white children, it is the girls who vary most.

McGee (W J) The old Yuma trail, Nat. Geogr. Mag., Washington, 1901, XII, 103–107, 129–143.) An interesting account, with 7 illustrations and map of the old Yuma trail in southern Arizona, its history, etc. The activity of the Amerinds in this region is noted.

Maclean (J.) Blackfoot amusements, (Amer. Antiq., Chicago, 1901, XXIII, 163–169.) A general account of the amusement-side of Blackfoot Indian life, songs, "teas," dances, gambling, foot-races, smoking, guessing-games, throwing games, swimming, etc. The texts (Blackfoot and English) of three brief songs (war, love, divorce) are given. According to an interpreter, "there existed an historical song, similar to the song of Hiawatha as recorded in "The Iroquois Book of Rites," but the only Indian who knew it is dead. The "tea feasts" are now quite a factor in Indian social life. Since the advent of the whites the great Buffalo dance has become "a begging dance." Like tea, cards for gaming were quickly adopted by the Blackfeet. The "smoke talk" was all-embracing and the topics innumerable. The game of "throwing the wheel," the Indians claim, was taught them by Napio, "the Old Man of the Mountains." The Blackfeet swim dog fashion.

Meeker (L. L.) Ogalala games. (Bull. Free Mus. of Sci. and Art, Phila., 1901, III, 23–46.) This article, illustrated with 26 text-figures, and accompanied by a vocabulary of Indian technical terms, treats of the games of Ogalala Indians of Pine Ridge reservation, "an isolated camp of full blood Indians." Men's games (great hoop, elk, buckskin hoop, moccasin), women's games (shinny, plumstone, deer-bone), boys' games (grizzly bear, wood shinny, whip top, etc.), girls' games, and play activities of a miscellaneous sort are briefly described. At pages 36–39 is an account of "games and sports of the boys and girls of an Ogalala camp in the summer of 1900, played for the writer's benefit." Pages 39–44 are occupied by a descriptive catalogue of the objects and implements used in these various games. Remarkable are the absence of whistling and the presence of "stopping the circulation in the hand" as an amusement.

Peabody (C.) The so-called "plummets." (Bull. Free Mus. of Sci. and

Peabody—*Continued.*

Art, Phila., 1901, III, 125–142.) In this interesting article, illustrated with 9 plates and 2 figures in the text, the author discusses the various theories concerning the use of the prehistoric objects known as "plummets," in connection with fishing, the chase and warfare, textile work, hitting and grinding, ornament, superstition, drum-rattles, real plummets, game stones, phallic objects,—all of these uses have been suggested by one investigator or another. The author's conclusion is: "All things considered, many of the New England 'plummets' were originally sinkers, while some of the larger ones were used as pestles and some of the smaller ones as bolas; many of the Florida specimens were probably sinkers, while the smaller and better worked ones were used as ornaments. The California specimens have been proved to be, many of them at least, charm stones. The beautifully worked and symmetrical specimens from the central civilization were very likely, in the absence of any better theory, wearing weights. Other uses in connection with fishing, the chase, and domestic pursuits, may have been common." These "plummets" are found from Maine to California.

Preuss (K. T.) Kosmische Hieroglyphen der Mexikaner. (Ztschr. f. Ethnol., Berlin, 1901, XXXIII, 1–47.) This valuable article, illustrated with 214 figures, treats of such "cosmic" symbols in ancient Mexican picture-writing as the "butterfly-half-moon," eye, cross, and cognate figures, snail, etc., their varieties, significations, and inter-relations. These figures are symbols of earth-goddesses, gods of death, and the earth, and their appearance on representations of the gods Quetzalcoatl, Tezcatlipoca, Mixcouatl, etc., is discussed, and the opinion expressed that these deities were originally chthonic.

—— Mexikanische Thonfiguren. (Globus, Braunschweig, 1901, LXXIX, 85–91.) Discusses, with 59 text-illustrations, the little clay figures and heads of deities, etc., which form so characteristic a part of Mexican antiquities. These figures in clay represent: Earth, maize and water goddesses; Tlaloc and Quetzalcoatl, rain and wind gods; Xipe, earth god; Macuilxochitl, god of play and song, and his fellows; Tezcatlipoca as patron of the dance-house. Some of these figures may have served as private deities; others were used by the shamans and those who practised magic. Few, if any, were mere children's toys.

Purpus (C. A.) Felsmalereien und Indianergräber in Tulare County, Kalifornien. (Ibid., 216–217.) Treats of rock-mortars, petroglyphs, and burial places in the "Digger Indian" country. The author notes that, unlike similar "pictured rocks" in British Columbia, Lower California, etc., these petroglyphs lack figures of human beings, mammals, birds, etc. Details of a grave-opening are also given.

Putnam (F. W.) A problem in American anthropology. (Ann. Rep. Smithson. Inst., Washington, 1899 [1901], 473–486.) This discussion of the unity or diversity of prehistoric man in America, the address of the retiring President of the A. A. A. S., 1899, is reprinted from *Science*, Aug. 25, 1899.

Reik (H. O.) Report on the examination of the ears of 440 school-children. (Bull. Johns Hopkins Hosp., Baltimore, 1900, XI, 318–321.) Brief general report with tables and figures. Dr Reik thinks "normal limit" for hearing is now too low. Boys exhibit more aural anomalies than girls,—due probably in some part to rougher life, caps, hats, etc. The most rapid growth of the auricle seems to be in the earlier years, there being little increase after the fifteenth. The author endorses Dr Hrdlička's views about the occurrence of "abnormalities" among the normal classes of the community.

Rivers (W. H. R.) The color-vision of the Eskimo. (Proc. Cambridge Philos. Soc., 1901, XI, 143–149.) Reports results of examination (in England) of 18 (ten males, eight females) Labrador Eskimo with Holmgren's wools, and of a study of Eskimo color-terms, both lexical and those obtained by presentation of colors. In this brief but valuable paper many interesting facts are brought out: The definiteness (exceptional for primitive peoples) of nomenclature for green and blue, the absence of the tendency (common to most primitive languages) to confuse blue and black; the extensive use of qualifying affixes and the denoting of

Rivers—*Continued.*
differences of color by using modifications of a few color-names (a process not very common in primitive tongues, where colors are named after natural objects more frequently); a superiority of the women in color matching and naming (said to be rather unusual in low stages of culture). These Eskimo resemble the generality of primitive people in the prominence of red in color-nomenclature, the absence of a word for brown, etc. Very remarkable is the following statement: "If one excepts three words, *sinanuk*, *aχjangatuk*, and *kaijuk*, which were comparatively rarely used, all hues, shades, and tints of color were named by various modifications of the six words for red, yellow, green, blue, white, and black." Also this: "The Eskimo, however, told me that in the autumn they could see all the colors I had shown them in the hills of their country, and it is possible that where color is only a transient occurrence in the year's experiences [color does not appear largely in Eskimo dress or decoration], it may excite more attention and therefore receive more definite nomenclature than in those parts of the world where luxuriance of color is so familiar that it receives little notice." This paper emphasizes the need of thorough-going studies of the color-vision of the American aborigines, from which important psychological results may flow. See Franklin (C. L.)

Sanford (D. A.) Education for allotted Indians, (South. Workman, Hampton, Va., 1901, XXX, 309–312.) Argues the advantages of sending Indian children to the same schools as white children.

Shaler (N. S.) American quality. (Internat. Mo., Burlington, Vt., 1901, IV, 48–67.) A discussion of the chief qualities, physical and mental, of man as an inhabitant of the United States, —"as suited to our kind as in any part of the earth." The American environment has proved hospitable to the red, the white, and the black races in numbers amounting to millions in each case. Among the qualities noted by Prof. Shaler are: Confidence in fellow-men (resulting in kindliness), commonwealth-ideal, allegiance within allegiance (State and Union), lawlessness within the law (lynching), religious freedom, public education, democracy in the household, non-critical frame of mind. Of the ultimate outcome the author takes an optimistic view.

Sparhawk (Frances C.) The Indian industries league. (South. Workman, Hampton, Va., 1901, XXX, 336–339.) Brief account of the origin and objects of this league, which exists for the double purpose of "opening individual opportunities of work to individual Indians, and of building up self-supporting industries in Indian communities."

Steffens (C.) Die Verfeinerung des Negertypus in den Vereinigten Staaten. (Globus, Braunschweig, 1901, LXXIX, 171–174.) In this article, with four text-figures (6 representative negroes), the author argues against the so-called "refinement" of the physical characteristics (physiognomy in particular) said to be due to his American environment and contact with the whites. What changes can be noted are probably due to intermixture of white blood. He admits, however, the advance of the negro in certain intellectual and industrial directions which would have been impossible in the African habitat—a sort of "negro aristocracy" has been developed.

von den Steinen (K.) Die Schraube keine Eskimo-Erfindung. (Ibid., 125–127.) A reply to a previous article in *Globus* by Krause (q v.). Dr von den Steinen adduces evidence to prove that the Eskimo have simply imitated the European screw. The article has nine text-figures. We have here only sporadic and occasional uses of a device borrowed from the Europeans, not a real Eskimo invention.

Strebel (H.) The sculptures of Santa Lucia Cozumahualpa, Guatemala, in the Hamburg Ethnological Museum. (Ann. Rep. Smithson. Inst., Washington, 1899 [1901], 549–561.) This article, illustrated with 11 plates, is translated from the Annual of the Hamburg Scientific Institute for 1893.

im Thurn (E. F.) Games of the Redmen of Guiana. (Folk-Lore, London, 1901, XII, 132–161.) This paper, which is illustrated with three plates, is in part reprinted from the rather inaccessible Guiana journal *Timehri*. Among the subjects treated are: Imitation by children of their elders; the

im Thurn—*Continued.*

"coming from town" dramatics of the Macusi children; "playing animal" (jaguar, monkey, *acoorie*, duck, ant-eater, trumpet-bird games); monkey-game of adult Arawaks; the Arawak *macquari* or whipping game (possibly a funeral rite),—a detailed description (pp. 141–150) is given; the Warau shield-game or *taratoo* (used as an ordeal), and the *parasheera*, a ceremonial feast of the Partamonas,—the last two are described with some minuteness. By "games" the author means "the pleasurable exercise of any of the bodily or mental faculties without any other purpose on the part of the player than either developing the faculty exercised, or developing in the player a fervid state of mind—in this case generally for quasi-religious purposes." In Guiana games are practically the education of Indian children. By them they become men and women. Ball-play, the author tells us, "is almost unrepresented among these utilitarian Red-men. I never saw any ball-game except among the Arekunas of Roraima." Its use only by adults and its rarity alike suggest borrowing from some other people. The "coming from town" representations are very interesting and afford abundant scope for the primitive imagination. Some of the animal-plays involve great physical skill and mental acumen. The drinking of *paiwarie* has in these latter days turned the *macquari* game into a regular orgy. Indeed, except mere children's games, the Warau shield-game is "the only one not accompanied by drinking." The Waraus, the author suggests, "have never risen to the level of a good drink," but it is interesting to know that "the energy, emulation, and excitement shown by the Waraus, in their liquorless game, are at least equal to those shown by the paiwarie-filled game-players of other tribes."

Vivian (C. A.) Yosemite legends. (Overland Monthly, San Francisco, 1901, XXXVII, 1068–1075.) Poetical versions of five Indian legends of Yosemite valley.

Wilson (T.) L'antiquité des peaux-rouges en Amérique. (Anthropologie, Paris, 1901, XII, 41–49.) Accepting the unity of the American race as proved, and presuming that at the time of the first appearance of the Indian in the new world the stock counted but a few individuals,—Prof. Wilson argues great antiquity for the Red Man from his wide extension and large numbers (millions at the period of European discovery). The multiplicity of languages, the condition of civilization of the various tribes, the fixity of type, persistence of characteristic traits, variety of implements, the kitchen-middens (far older than any mounds), are other evidences of high antiquity. At least 2000 B.C. (probably much earlier) must be fixed upon for the appearance of the Red Race in America,—the immigration (from Europe?) took place in the paleolithic period.

Wortman (J. L.) The probable successors of certain North American primates. (Science, Lancaster, Pa., 1901, N. S., XIII, 209–211.) Author holds that not only are the extinct North American forms and the living South American *Cebidæ* similar, but "the one was the direct descendant of the other." Moreover, "had the conditions been favorable, and the southern barriers been sufficient to arrest further progress, we could believe that through stress of environment a much higher type of monkey, and possibly a man, might have been evolved in the Western Hemisphere in the manner so ingeniously suggested by Duncan."

NOTES AND NEWS

Anthropology at the University of California.—A department of anthropology has been established by the regents of the University of California. The work of this department, for the present, will be anthropological research and the formation of a museum. Mrs Phœbe A. Hearst has for several years been collecting a large amount of valuable material from the several expeditions she has established, particularly in Egypt, in Peru, and in California. These collections she gives to the University at Berkeley. The University has also a large collection from Alaska, presented by the Alaskan Commercial Company; and it is known that other collections are to become the property of the University when the museum is established. There are also now in the University many archeological specimens and human crania obtained from various parts of the state. For the storage and preservation of all this valuable material a temporary fireproof building of brick and iron is to be erected at once. It is believed that this action will also be an incentive to the friends of the University to provide the funds for a museum building adequate for the proper exhibition of the collections in all departments.

As an encouragement to others and as an expression of her great interest in the new department, Mrs Hearst, who is one of the regents and a most generous patron of the University, makes a gift of $50,000 a year for five years for anthropological research. This amount will be devoted to continuation of the work in Egypt and in South America and to obtaining Greek and Roman antiquities; also to a thorough research of the archeology and ethnology of California, with particular reference to investigations of the deposits from the supposed Pliocene gravels to recent times, with the object of discovering when man first appeared on the Pacific coast; also to a study of the many Indian tribes of California, their languages, myths, and customs. For this work several parties are already in the field.

At present there will be no regular courses in the department, but university lectures on special topics in anthropology will be given from time to time. The first of these lectures was delivered on September 20 by Prof. F. W. Putnam, who was invited to outline the purpose and scope of the new department and the methods of anthropological

research. The second lecture was by Miss Alice C. Fletcher on the value of ethnological study. The third lecture, by Mrs Zelia Nuttall, was on the picture-writing of the ancient Mexicans.

Dr A. L. Kroeber and Mr P. E. Goddard have been appointed respectively instructor and assistant in anthropology with assignment for field-work among the Indians of California. Prof. J. C. Merriam of the paleontological department has been given immediate charge of the research among the gravel deposits. Dr P. M. Jones is engaged in archeological work with special reference to Santa Rosa island. An honorary advisory committee has been appointed by the regents, as follows: Dr Benjamin I. Wheeler, President of the University; Prof. F. W. Putnam, Chairman of the Committee; Mrs Phœbe Hearst; Miss Alice C. Fletcher; Mrs Zelia Nuttall; Dr Franz Boas; Prof. John C. Merriam. Mr J. G. M. E. d'Aquin has been appointed assistant secretary and executive officer of the department.

The Savage Progressive and the Savage Stationary.—Mr William Stetson Merrill, of Chicago, sends the following extract from an article on "Savages," by Rev. Joseph Rickaby, S. J., in *The Month*, a Catholic magazine, London, September, 1901, pp. 281–282: "Supposing all mankind to have been at some remote epoch[1] together down on the low level of savagery, it is a serious difficulty to conceive how ever they could have risen. The lowest savages that we know are not progressive races; it does not look as though a thousand years of existence would improve them. If we may trust the traditions of the indigenous races of America and other countries, whenever an improvement has been effected, it has been by means of strangers from without, superior persons, coming in upon and educating an inferior race. With all the world on a dead level of savagery there would be no superior persons. . . . This is one of the many difficulties of Anthropology. I have never seen it considered and met. If all mankind were Hottentots six thousand years ago, they would probably be Hottentots to this day; or (more likely) the breed would have died out I have a suggestion to meet this difficulty.[2] I opine that there are savages and savages: savages who are such merely by stress of circumstances, and other savages who have in their blood the elements of degeneration and degradation; in other words, progressive savages and stationary savages, just as a farmer might have on his land stock that he could improve in time, and bad cattle that can never be improved.

[1] A very remote epoch if it be true that Egyptian civilization (to say nothing of Assyrian and Chinese) can be traced to some such date as 4500 B. C.

[2] I owe the suggestion to the sagacity of a friend.

How came these stationary savages to be? Principally, I take it, by gross violation of the natural law of marriage.[1] Other causes, as poverty and hardship, may have helped. The stationary savage then is a savage who has deteriorated, coming of better ancestors, and in his degeneracy has sunk so low as to become hopeless. If this be true—and I merely put it forward as an hypothesis to be considered—scientific enquirers are committing an error when they put together and fuse into one common mass of evidence all particulars that they find, no matter about what savages, and argue thence the common characteristics of the savage state. Instead of that, they should distinguish savage from savage, the savage progressive from the savage degenerate and unimprovable. I think the hypothesis worthy of consideration, because while there are many observed facts of savage life remaining savage, little or nothing has been observed—I do not say, nothing has been argued, but nothing has been observed—of savages actually making progress of themselves, unaided by any superior race. Moreover, observation of certain savages seems to show them destitute of all native aptitude for progress, when left to themselves. Are we not rash in taking any and every savage race that we encounter for a type of the ancestors of civilized man?"

Egyptian Mummification.—In a communication to Dr D. S. Lamb regarding the latter's article on "Mummies and Mummification" in the last issue of this journal, Dr J. E. Quibell, of the Museum at Gizeh, writes as follows:

"I thank you much for your paper on Mummification of which you have been so good as to send me a copy. I have read it with great interest and have one or two brief remarks to make.

"Page 296.—El Omra is a prehistoric site and Virchow reasons from a cemetery perhaps 3000 years later in date.

"Page 297.—The period is . . . 3300 to 3000 B.C. This was *the* mistake of the book. We observed correctly, but misinterpreted the evidence. It is now proved to everyone's satisfaction that these contracted burials belong to the First dynasty and earlier. Maspero only would omit the words 'and earlier.'

"Now, the greater number, by far, of these very early burials (archaic, prehistoric, First dynasty, or whatever they may be called) contain skeletons only. It was but in a single division of the Naqada cemetery that the dried-up bodies were found. Mummy-wrappings, bitumen, salt, are *never* found with them. They must be considered apart from the mummies of the later, classical Egyptian period. Indeed

[1] The Zulus, I am informed, do say this of the inferior races about them.

I have observed in a series of cemeteries that mummification is *extremely rare* until the Eighteenth dynasty. We speculated when digging at Naqada as to how the dried-up bodies came into their peculiar condition, though I do not think anything much was printed. A man who worked with us there (Price) and who had had experience in Mexican archeology, suggested that the bodies had been artificially dried. Or, we thought, it is possible that in this part of the cemetery the ground has some peculiar property of preserving bodies from decay; but there was no obvious difference between this soil and soil near it which contained only skeletons.

"There *is* soil in Egypt in which bodies do not decay. There is a case known (Wilbour, a distinguished American Egyptologist, told me of it) of a Greek apothecary who died at Assuan in one of the last cholera outbreaks, and whose body, dug up and sold as a mummy by the Arabs, was recognized by his friends in Cairo.

"There is more evidence of these dried brains than is printed. We saw more than one pretty perfect at Naqada and *often* found the brain dried up to a red resin-looking mass, but broken. The rarity was *to find the convolutions well marked.* M. Legrain tells me that he found similar brains at Silsileh six years ago and I think I heard Dr Rivers (of St. John's College, Cambridge) say this year that he had seen one while he was staying at El Omra.

"I will try to get you one. I cannot be sure, but my position as Travelling Inspector of Antiquities may give me a chance."

Apache and Navaho Fire-making.—While among the White Mountain Apache last summer the writer had opportunity to collect interesting details with regard to fire-making. Having procured dried flower-stalks of *Yucca baccata*, an Apache visitor to our camp was asked to make fire with them. Without leaving his squatting-place on the ground, he took the sticks, selected the tapering upper portion of one of the stalks for a drill, polished off the inequalities formed by the leaf scars, and rounded the lower end by means of a sandstone picked up at his feet. The thicker portion of the stalk was chosen for the hearth. Another small stone, also picked up from the ground, having a rounded corner about the size of the end of the first finger, was ground against the hearth and soon reamed a cavity suitable for the reception of the end of the drill. A moment's search on the ground within a foot or so brought to light a bit of flint, which was used to saw the groove leading from the cavity down the side of the stick. Then he sank a stone to the level of the ground in order to insure stability for the hearth, set the hearth with the cavity over the stone, took the drill between his

palms, and twirled out fire in the shape of a glowing coal held in the groove of the hearth. Reaching out, he picked up a piece of dry dung, broke it in two, knocked the coal between the pieces, blew it a moment, and the fire was assured. No attempt at speed was made, but the Indian maintained that with sticks of his selection he could have a blaze started in the time necessary for a match to burn out. As the "Alligator" match, a slow but sure sulphur variety used in this part of the world, will probably last for three quarters of a minute, the statement of the Apache seems plausible. The late Captain John G. Bourke stated that the Apache can grind out fire in ten seconds. The operation of fire-getting as noted here is refreshingly primitive, being carried on as though the white man had never existed. The drill is called *na-des-kia*, referring to the flowering stalk of the yucca; the hearth is *kai-ets-o-se*; and tinder, usually decayed wood from a hollow tree, *tchin-sish*. The word for fire is *ko*; I make fire, *kod-nishi-ni*. When given a match to light their cigarettes, Apache women preserve fire against exigencies by igniting a little bunch of grass or leaves near where they sit.

Among the Navaho general acquaintance with the art of fire-making with the drill has passed away, only medicine-men practising it now. It is customary to set a small cylindrical piece of the wood of *Artemisia tridentata* (Navaho, *tsa*) in the end of the drill. The hearth is preferably the soft stalk of a large weed, while the tinder is of softened bast of juniper or cottonwood. Sand is usually put in the cavity of the hearth to increase friction. The drill is called *ól-kóñ*; the hearth, *pé-ol-kóñ*; and bark tinder, *azhi*. Flint-and-steel are called *tlésh*; matches, *set-leshe*. The word for fire is *kóñ*. Fire is carried by clamping a coal between two sticks held in the hand.

WALTER HOUGH.

Andrew Ellicott Douglass. — Andrew Ellicott Douglass, who died at New York City, September 30, in his eighty-second year, was born at West Point, New York, November 18, 1819. His father was Major David Bates Douglass, and his mother the daughter of Andrew Ellicott, professor of mathematics in the West Point Military Academy. Mr Douglass was graduated from Kenyon College in 1838, receiving the degree of A.M. in 1841. At the close of his undergraduate course he engaged in business with the concern which subsequently became the Hazard Powder Company, and was elected its president in 1867. After a successful career he retired in 1876, henceforward giving much of his time and means to the study of Indian remains in the United States. Mr Douglass spent ten winters in archeological exploration of the Florida coast, locating over fifty mounds, many of which he excavated.

He gave particular attention to the study of the various implements employed by prehistoric man in America, with the result that during the twenty years following his retirement from active business, he gathered a collection of over twenty-two thousand specimens, which were presented to the American Museum of Natural History during the present year. This collection was arranged in various special classes irrespective of geographic distribution, but with the purpose of illustrating the varieties of each class and of solving the problems of their use. Of these specimens the several hundred hematite objects form what is perhaps the largest collection of its sort in the United States. The collection is exhaustively catalogued in that painstaking manner so characteristic of its former owner. Mr Douglass contributed to the *Bulletin* of the American Museum of Natural History, "A Table of the Geographical Distribution of American Indian Relics." He sought the literature of American archeology almost as assiduously as he did the objective material pertaining to the subject, consequently gathering a valuable library. He was a member of a number of organizations, among them being the Metropolitan Museum of Art, the American Museum of Natural History (of which he was a patron), the Anthropological Society of Washington, the American Ethnological Society, and the American Geographical Society. Mr Douglass was also a life member of the Anthropological Society of Paris and a fellow of the American Association for the Advancement of Science. In his death American Archeology has lost an enthusiastic devotee and a warm friend.

HARLAN I. SMITH.

Etymology of "Caribou."—The etymology of this word, which appears in French as early as the first quarter of the seventeenth century, and in English by the eighteenth, has always been uncertain. *Caribou* undoubtedly came into English from the French of Canada, and has been looked upon by some as not an Indian word at all, but the corruption of a French one. This view is given specious support by the fact that the Micmac word for horse, *tesibu*, is a corrupt form of the French *des chevaux*. Other etymologies, of more or less absurdity, varying from a derivation from an alleged French *cerf-bœuf*, to an identification with *carabao*, the Spanish-Filipino name of the East Indian buffalo, have been suggested. But it is altogether unlikely that the Indians would be under the necessity of borrowing a term to name an animal so characteristic of their habitat as was and is the *caribou*. If an Indian word, it is from the Micmac dialects that the origin of *caribou* must be sought. Indeed, most authorities have contented themselves with stating that such is the case. The Micmac word for *caribou* is

kălibû' or *kálibû*. What is, apparently, the true etymology of the term has recently been pointed out by Dr A. S. Gatschet[1] in a note on the dice-game played with discs of caribou bone: "The cariboo is still frequent in the woods of Nova Scotia and New Brunswick, and is called so, *χalibû'* (in Quoddy *megali'p*), from its habit of shoveling the snow with its forelegs, which is done to find the food (grass) covered by the snow,—*χalibû' mulχadéget* (Micmac), 'the cariboo is scratching or shoveling.'" It would thus seem that *caribou* is really a Micmac word meaning "pawer, scratcher, or shoveler," in the sense indicated. This is a natural and satisfactory etymology.

A. F. CHAMBERLAIN.

The African Society.—Owing to the remarkable interest aroused by the writings and lectures of the late Miss Mary Kingsley with reference to the natives of West Africa, their customs and racial characteristics, it was decided some months ago to perpetuate her memory by the foundation, in London, of a society for the study of the special subjects in which she was a conspicuously ardent worker. An Association was accordingly formed under the title of "The Mary Kingsley Society of West Africa," donations amounting to £700 being collected, and branch societies being established on the West Coast of Africa. More recently it was decided to extend its scope, and accordingly its title has been altered to that of "The African Society"; for it is felt that the time has arrived for the permanent establishment on a sound footing of an institution devoted to the study of all subjects connected with the great continent. West Africa, however, from which the Society has already received much support and encouragement, will naturally receive its first attention. The Society hopes to become a working information bureau for Africa. Its first object will be the study of native usages, institutions, customs, religions, and antiquities, scientifically conducted but having a practical bearing on the life of the people and the development of the country. In the present condition of the continent it has become a matter of absolute necessity that Europeans should more than heretofore be made acquainted with the habits of life, the feelings and thoughts of the natives, the laws and customs which govern their daily life, the conditions of their land-tenure, and the tribal institutions which affect the labor market. Native arts and industries are equally deserving of study with a view to their possible development. Persons interested in the new organization may communicate with the Secretary, Mr Robert Sewell, 22 Albemarle St., London, W., England.

[1] Bull. Free Mus. of Science and Art, Phila., 1900, vol. II, p. 191.

Poisoned Arrows for Blowguns.—The French *sarbacane*, the Italian and Spanish *cerbotana*, the Portuguese *gravatana*, and the German *Blasrohr* (blow-tube), is, according to Demmin (p. 468), *arbotana*, or rather *carpicanna*, derived from Carpi, the place of manufacture, and the Assyrian (*Kane*), Greek and Latin κάννα (*canna*), whence "cannon." This tube, spread over three distinct racial areas in southern Asia, Africa, and America, is used either for propelling clay balls or arrowlets, poisoned or otherwise. It is the *sumpitan* of Borneo, where Pigafetta (1520) mentions reeds of this kind in Cayayan and Palavan islands. The hollow bamboo is used by the Laos of Siam, and is preserved among the Malagasy as a boyish means of killing birds. Père Bourieu notes it among the Malaccan negrito aborigines, whom the Moslem Malays call Oran-Banua ("Men of the Woods"); the weapon they term *tomeang*. It is known in Ceylon, in Silhet, and on both sides of the Bay of Bengal. Condamine describes it among the Yameos (South American Indians); Waterlow and Klemm, in New Guinea, and Markham among the Uapes and other tribes on the Amazon headwaters. In the New World it is of two varieties—the long, heavy *zarabatana*, and the thinner, slighter *pucuna*. Finally, it has degraded to the "pea-shooter" of modern Europe. The principal feature of the weapon is the poisoned dart; it is therefore unknown amongst tribes who, like the Andamanese, have not studied toxics. (*Journ. Anthrop. Inst.*, p. 270, February, 1882. Burton on the Sword, p. 14, note 2.)

THOMAS WILSON.

A New Archeological Publication.—The Archeological Section of the Wisconsin Natural History Society will publish, at regular intervals, a six- or eight-page sheet to be devoted to Wisconsin archeology. By this means it is hoped to keep alive and further the interest of the students, educators, and collectors of Wisconsin in bringing about a better state of affairs regarding the preservation of the prehistoric monuments in the state. The present uninterested attitude of the legislators argues that, for a year or two, at least, no bill favoring a state survey can be introduced. It is therefore deemed best, at present, to band together all persons interested, until the time for action shall arrive, so that the project can be carried to a successful issue. The bulletin is to be the organ of the campaign for a state archeological survey. It will not trespass on the field of the journals now being published and which, being of a nature technically beyond the training of the state collectors, are not available for this purpose. It is intended to publish articles of local interest, general articles intended to train the average student, editorials favoring free study and preservation of antiquities,

notes, contributions of state collectors and students, notices of books bearing on Wisconsin archeology; in fine, all matter which will make the bulletin of particular value to the archeologists of Wisconsin. Mr Charles E. Brown, of the Milwaukee Public Museum, is acting editor of the publication, which will be known as the *Wisconsin Archeologist*.

HARLAN I. SMITH.

Dr Walter Hough has completed an interesting and valuable exploration covering five months in northeastern Arizona, and has returned to Washington with large collections, mainly archeological, for the United States National Museum. Holbrook, Arizona, was the base of supplies, and from this point were examined a group of ruins thirty miles southwest, on the first ridges of the White Mountain plateau; three groups in the region of the Petrified Forest; five groups between Snowflake and Fort Apache; and the ancient Hopi ruins in the Jedidoh Valley series. In the course of this season's work Dr Hough made observations on more than fifty-five village sites, excavating in eighteen, and learning of the position of many others in the region. He also collected ethnological material from the Apache, Navaho, and Hopi. During the month of May the work was carried on at the expense of the National Museum; for the remainder of the season the outfit was furnished through the liberality of Mr P. G. Gates, to whose interest in American ethnology and archeology the extensive opportunities afforded are due. Mr A. C. Vroman of Pasadena, California, whose photographs of Southwestern subjects are so favorably known, was a member of the party during the exploration in Tusayan. The great hindrance to successful archeologic work in this region lies in the fact that there is scarcely an ancient dwelling site or cemetery that has not been vandalized by "pottery diggers" for personal gain. Dr Hough expects to present his results in a report on the season's work.

Phillips Academy, of Andover, Massachusetts, has received a large sum of money through the munificence of a gentleman and his wife, who wish their names withheld from the public, for the purpose of establishing a Department of American Archeology. It is the purpose of the committee having the new department in charge to erect a suitable museum which shall also contain recitation halls, offices, and a large reception room where the students may assemble afternoons and evenings. The late Dr C. F. P. Bancroft, Principal of Phillips Academy up to the time of his death, was to have been selected Principal of the new department; Dr Charles Peabody of Harvard is Honorary Director; Mr Warren K. Moorehead has been elected Curator. The

department began its official life May 1st, with some 40,000 specimens from all parts of the United States. These have been selected by the Curator during the last six years for the founder. Dr Peabody and Mr Moorehead will deliver in the course of the season a series of lectures on various anthropological subjects. The purpose of the museum is not so much to conduct field explorations as to study the unknown types of artifacts now on exhibition in the various museums, including those in the Andover collection.

Dr L. Serrurier, teacher of geography and ethnology in the Gymnasium Willem III, at Batavia, Java, died in that city July 7. Dr Serrurier was the first salaried director of the Royal Ethnographical Museum at Leiden, serving in that capacity from 1891 to 1896, when he resigned. During his services for this museum, which commenced in 1887, its work was greatly promoted. To him was due the remarkable increase in the Indonesian, Japanese, African, and American collections; he also established the department of anthropology of the museum as well as its library, and laid the foundation for its fine photographic collection. Dr Serrurier's continuation of Hoffmann's Netherland-Japanese Dictionary, as well as important works on Javanese magic and Japanese bibliography were unfortunately not finished at the time of his death.

Anthropological Society of Paris.—Although its first meeting was held May 19, 1859, it was not until the issuance of the ministerial decree of January 10, 1861, that the "Société d'Anthropologie de Paris" was formally recognized and approved by the authorities. At the suggestion of M. Chervin, its president, the Society celebrated its fortieth anniversary by a banquet on March 12, at the Palais d'Orsay hotel, which was presided over by the Minister of Public Instruction, and graced by the presence of representatives of various foreign anthropological societies. Two days afterward M. Chervin gave a dinner to the distinguished men of science who had been present at the banquet. As a result, a committee of the Society on "international relations," with Dr Verneau as chairman, was appointed.

Father William Pope.—News has been received of the death of Father William Pope at Regla, near Havana, Cuba, about July 1, aged about sixty. For many years Father Pope resided as a missionary among the Maya Indians of Yucatan, whose language he spoke with greater fluency than probably any other American. He was also a thorough Spanish scholar. On the outbreak of the war which has resulted in the final subjugation of the Mayas he, with other missionaries,

was ordered out of the country by the Mexican government and came to the United States in time to join the first expedition to Cuba as official translator. Later he acted as chaplain at Santiago de Cuba and was in charge of a congregation at Regla at the time of his death.

JAMES MOONEY.

Dr León's Studies.—With the recent establishment of the Section of Anthropology and Ethnography, in charge of Dr Nicolas León, the noted Tarascan specialist, the National Museum of Mexico seems to have taken on new life. Within the last few months Dr León himself has published under the auspices of the Museum a bibliography of somatologic works relating to Mexico,—in which we note several names well-known in this country,—and a classification of Mexican linguistic stocks, while an ethnographic map of Mexico and a study of the Huavi tribe of Tehuantepec are in preparation. A privately printed bibliography of Dr León's original papers, translations, and editings, including several now in press, aggregates over 150 titles.

JAMES MOONEY.

Dr Joshua Miller, president of the Arizona Antiquarian Association, died at Flagstaff, Arizona, July 23, 1901, after a brief illness, aged fifty-five years. Although originally of Missouri, Dr Miller was best known as an enthusiastic, tireless investigator of Southwestern archeology and ethnology, and had done much to arouse and keep alive the interest in such studies in Arizona. While for a long time he had been in failing health, the end came very unexpectedly, and in a letter written only a few weeks before his death he tells of excavations which he was then supervising and of his plans for a summer campaign with the Hopi, to continue his study of their peculiar ceremonies.

JAMES MOONEY.

Preservation of Caverns and Prehistoric Stations.—The Twelfth International Congress of Prehistoric Anthropology and Archeology passed votes asking for a law for the preservation of caverns known to have been inhabited by prehistoric man, and for the prohibition of unauthorized exploitation of them. The French Minister of Public Instruction, to whom the request was made, has declared that the law of March 30, 1887, and the decree of January 3, 1889, concerning the preservation of prehistoric monuments, cover the case and make special legislation unnecessary. A. F. CHAMBERLAIN.

Hollowing Pipe-stems. — In order to hollow out a pipe-stem in an emergency the Chippewaian Indians of the Northwest Territory and the Athapascan tribes of central Alaska take a stem three quarters of an

inch in diameter and about six inches long, of willow, birch, or any soft wood, and cut a notch in all round as far as the first annual ring of growth. By patiently and carefully pulling and twisting, the first year's growth is drawn out from the center of the cylinder, making a clear hole. S. J. ENTRIKIN.

GREEK PROVERBS.—The collection of modern Greek proverbs and proverbial locutions, by Politis, now in process of publication by the "Marasli Library" in Athens, is a noteworthy compilation. Besides proverbs from literature, etc., the author, who is a professor in the University of Athens, has gathered over 18,000 from the people of the various parts of Greece. This work has been awarded the Zappas prize of the "Association pour l'encouragement des Études grecques," for 1899–1900. A. F. C.

RUSSIFICATION OF THE SYRJANS.—According to a report in *Globus* of a lecture by K. F. Shakow before the Russian Geographical Society, the Syrjans of the northern Uralian region are in process of complete Russification. This mania for everything Russian has its bad as well as its good side, and this too ready denationalization, while carrying with it certain material advancement, seems to entail not a little moral retrogression. A. F. C.

POLISH ZOÖLOGICAL AND BOTANICAL DICTIONARY.—The *Slownik nazwisk zoologicznych i botanicznych polskich* of E. Majewski, the two volumes (Warsaw, 1894–1900) of which contain 1438 pages quarto, represents the work of many years, and covers the field from the sixteenth century down. Some 42,500 Polish names are cited, besides nearly 3000 from other Slavonic sources. A. F. C.

DR FRIEDRICH S. KRAUSS, of Vienna, the noted Slavic ethnologist, has recovered from a severe prostration brought about by over-exertion as secretary of an organization for the relief of the oppressed Rumanian Jews, and expects soon to resume his investigations among the Serbs, Croats, and other South Slavic races. J. M.

SPELEOLOGY.— Beginning with March 5th, M. Martel, the well-known cave-explorer, has given at the Paris Faculty of Sciences a weekly free course on Speleology. Among other topics considered are the prehistoric stations of the Vézère. A. F. C.

DR WILLY FOY has been appointed director of the Joest-Rautenstrauch Museum at Cologne to succeed Professor Weule, resigned. Dr Foy was formerly an assistant in the Royal Museum at Dresden.

MR MARSHALL H. SAVILLE has been named Officier d'Académie by the French government in recognition of his archeological researches in Mexico for the American Museum of Natural History.

THE SOCIÉTÉ DE GÉOGRAPHIE of Paris has awarded the Pierre-Felix Fournier prize to Dr H. Deniker, in recognition of the excellence of his work, *Les Races et les Peuples de la Terre.*

DR ÉMILE CAREL VAN DER HELLEN, a member of the Dutch expedition to Portuguese West Africa, organized in 1884 by D. D. Veth, died in Mossamedes, Southwest Africa, June 4.

DR K. TH. PREUSS, known particularly through his important ethnologic researches in New Guinea, has been appointed directorial assistant in the Royal Museum at Berlin.

PROCEEDINGS OF THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON

JANUARY 8 TO MAY 18, 1901

January 8, 1901

The 311th regular and 22d annual meeting of the Anthropological Society of Washington was held in the assembly hall of the Cosmos Club, with President W J McGee in the chair.

The minutes of the 310th regular meeting and of the 21st annual meeting were read and approved. The reports of the General Secretary, the Secretary of the Board of Managers, and the Treasurer were read, accepted, and placed on file.

Two amendments to the By-laws were taken up, considered, and lost. An amendment to Article I, Section 6, was proposed by Dr D. S. Lamb, to be acted on at the next annual meeting.

This being the time for the election of officers for the ensuing year, the following were elected by ballot: President, W. H. Holmes; General Secretary, Hannah L. Bartlett; Treasurer, P. B. Pierce; Curator, Marianna P. Seaman; Members of the Council: Alice C. Fletcher, J. Walter Fewkes, J. D. McGuire.

Meeting adjourned.

H. L. BARTLETT, *General Secretary.*

January 22, 1901

The 312th regular meeting of the Anthropological Society was held in the assembly hall of the Cosmos Club. On account of the illness of President Holmes, Miss Fletcher, one of the Vice-Presidents, occupied the chair.

The minutes of the 311th regular meeting and the 22d annual meeting were read and approved. The Secretary of the Board of Managers announced the election to active membership of Mrs Sarah S. James, Victor Mindeleff, and Dr Immanuel M. Casanowicz, all of Washington, D. C.

An antique German clock was exhibited by Dr G. M. Kober. Mr W J McGee gave a brief account of the Topeka-Cocopa expedition into Mexico during the last autumn.

The paper of the evening was on "Philology" by Major J. W. Powell. (Major Powell's paper appears in the *American Anthropologist*, Vol. 2, No. 4, pp. 603–637.)

Meeting adjourned.

H. L. BARTLETT, *General Secretary.*

February 9, 1901

The 313th regular meeting of the Anthropological Society was held in the assembly hall of the Cosmos Club, the President, W. H. Holmes, in the chair.

The minutes of the last meeting were read and approved. The President announced the death of three members of the Society, namely, Col. F. F. Hilder, Mr Miles Rock, and Dr Samuel C. Busey.

Mr Paul Brockett exhibited a facsimile of an ancient Mexican codex and a modern Japanese book. A Peruvian mummy was unwrapped by Mr W. H. Holmes and Dr Walter Hough of the National Museum. The paper of the evening was "The Peopling of America," by W. H. Holmes.

Meeting adjourned.

H. L. BARTLETT, *General Secretary.*

February 26, 1901

The 314th regular meeting of the Anthropological Society was held at Columbian University, under the auspices of the Washington Academy of Sciences, when the annual address was given by Mr W J McGee, the retiring President of the Society. The subject was "Man's Place in Nature." (Mr McGee's address appears in the *American Anthropologist*, Vol. 3, No. 1, pp. 1–13.)

Meeting adjourned.

H. L. BARTLETT, *General Secretary.*

March 12, 1901

The 315th regular meeting of the Anthropological Society was held in the assembly hall of the Cosmos Club, with President Holmes in the chair.

The minutes of the 313th and 314th meetings were read and approved. Dr J. Walter Fewkes exhibited some historical documents, including one old map of what is now Arizona and New Mexico, made

by the Franciscan friar Menchero ; a copy of a map made about the year 1500 by Juan de la Cosa ; and a manuscript by Alzate y Ramirez, being a description of the ruin of Xochicalco. Mr W. H. Holmes exhibited some instruments of torture from Hanover, and an iron frame used to inclose the body of a criminal sentenced to be "hung in chains," found in Virginia two years since.

The first paper of the evening was "Ethnology in the Jesuit Relations," by Mr J. D. McGuire. (This paper has been published in the *American Anthropologist*, Vol. 3, No. 2, pp. 257–269.)

The second contribution was an address on "The Cocopa Indians" by Mr W J McGee. The speaker described the physical characteristics and activities of the Cocopa Indians occupying the lower valley of the Rio Colorado, in both Sonora and Lower California. Special attention was given to the primitive agriculture of the tribe, in which aboriginal corn, beans, and squashes are planted and harvested, and to the manner in which this agriculture is conditioned by the annual freshets of the river. Attention was also given to the social organization of the tribe, and to the influence exerted on the tribal life by mortuary customs and other ceremonies. The Cocopa were discovered by Alarcon and Melchior Diaz in 1540. They formerly numbered thousands, but are greatly reduced. By their own estimates they reached one thousand in 1890, but little, if any, more than five hundred in 1900. The speaker gave the leading factor in their decline as undoubtedly the adoption of Caucasian clothing, which is unsuitable to their riparian habits and flimsy habitations.

Meeting adjourned.

H. L. BARTLETT, *General Secretary.*

March 26, 1901

The 316th regular meeting of the Anthropological Society was held in the assembly hall of the Cosmos Club, with Vice-President Lamb in the chair.

The minutes of the last meeting were read and approved. The Secretary of the Board of Managers announced the election to active membership of Mr George R. Davitt.

Mr William Palmer, of the National Museum, gave a practical illustration of the making of a life-mask. Dr Casanowicz exhibited some Assyrian seals from Hillah ; also some magic bowls, or Jewish incantation bowls. Mr Holmes showed some remarkably fine stone knives.

The paper of the evening was by Dr W. W. Johnston, and was entitled "The Ill-health of Charles Darwin : its Nature and its Relation

to his Work." (Dr Johnston's paper appears in the *American Anthropologist*, Vol. 3, No. 1, pp. 139–158.)

Meeting adjourned.

H. L. BARTLETT, *General Secretary.*

April 9, 1901

The 317th regular meeting of the Anthropological Society was held in the assembly hall of the Cosmos Club, with the President, W. H. Holmes, in the chair.

The minutes of the last meeting were read and approved. The Secretary of the Board of Managers announced the election to active membership of Henry D. Parson, Constance Goddard Du Bois, Paul Beckwith, George C. Maynard, and George A. Dorsey, and the reinstatement of Thomas C. Robinson.

Mr George C. Maynard exhibited a sun-dial used by the Indians of Labrador, a water clock of the seventeenth century, sand glasses of the fourteenth century, some time-keeping lamps, and a model of a time-keeping candle.

The subject of the paper of the evening was "The Immigration Question" by Mr Edward F. McSweeny, Assistant Commissioner of Immigration, Port of New York. The speaker alluded to the manifold causes of migration—famine, desire for conquest, ambition, religious persecution, political revolution, and love of gold (the most potent factor). Between 1790 and 1820 only 250,000 immigrants came to America; between 1820 and 1900 more than 25,000,000 left their homes as emigrants. While in former years most of the immigrants came from Ireland and Germany, now they come mainly from Austria-Hungary, Italy, and the Orient—including Greeks, Armenians, and Arabs. The latter are the most undesirable class we have to deal with on account of their laziness and criminal propensities. The races whose coming to America has been productive of the most good are those of strong religious faith, viz., the Germans, Irish, and Scandinavians; while most of the races now coming seem to have little care for religion of any sort. Wages have been highest during those years of the greatest immigration. The Federal Government took control of the immigration question for the Port of New York in 1890, and under the law paupers, idiots, insane persons, persons suffering from dangerous contagious diseases, and persons coming under contract to perform labor in the United States are forbidden to land, and the steamship companies are required to return them free of charge. The speaker recalled the

fact that the decline of Rome dated from the rise of the alien races and advised this country to give careful consideration to the whole question.

Meeting adjourned.

H. L. BARTLETT, *General Secretary.*

April 23, 1901

The 318th regular meeting of the Anthropological Society was held in the assembly hall of the Cosmos Club, with Vice-President McGee in the chair.

The minutes of the last meeting were read and approved. Mr C. H. Townsend exhibited some implements of the Polynesian *tapa* industry and explained the process of making *tapa* cloth from the bark of a species of mulberry tree ; he also showed samples of the Hawaiian *tapa* cloth which displayed beauty and variety of color and design.

Mrs Zelia Nuttall presented two papers, namely, " Ancient Mexican Manuscripts and their Mode of Decipherment," and " Chalchihuitl in Ancient Mexico." Mrs Nuttall exhibited a facsimile copy of the ancient Mexican codex which she recently brought to light in England, and gave a brief account of its history and contents. She explained the principles of ancient Mexican pictography and drew on the blackboard a number of native hieroglyphs taken from various codices, and representing local and personal names. The native method was demonstrated by a series of examples of the manner in which Mexican scribes recorded the names and titles of Spanish viceroys and governors in hieroglyphs. (Mrs Nuttall's paper on " Chalchihuitl in Ancient Mexico " appears in the *American Anthropologist*, Vol. 3, No. 2, pp. 227–238.)

Meeting adjourned.

H. L. BARTLETT, *General Secretary.*

May 4, 1901

The 319th regular meeting of the Anthropological Society was held in the assembly hall of the Cosmos Club with the President, W. H. Holmes, in the chair. The minutes of the last meeting were read and approved.

Mr W J McGee, in an address on " Poisoned Arrows," noted that the arrow-poison of the American Indian is magical or thaumaturgic or necromantic in motive. The speaker mentioned cases in which the brews of the aboriginal magicians were necessarily septic and hence sometimes effective in producing death ; and he exhibited a bow made by a Pamunky-Tuscarora Indian, to which magical potency was believed to be given by a carved effigy head at one end — this head

being provided with horns in order that the arrows shot from it might be penetrating, and with snake-rattle ear-pendants in order that they might be venomous. In use both this effigy and the arrows were treated with a brew, made by extracting the head-contents of a number of rattlesnakes and cooking them in an earthen vessel until the fat arose in a scum; this was set aside for ten days, after which it was ready for use. In connection with the discussion which followed, the speaker questioned whether any native American Indian ever produced a vegetal poison capable of effective use on arrows, and urged the extreme desirability of careful observation so made as to discriminate between the incidental septicemia apparently produced in some cases and actual toxic poisoning.

Mr Holmes exhibited a South American blow-gun obtained by Professor Stein's expedition up the Amazon, together with a belt of bark worn by the user of the gun and a bottle of poison for poisoning the arrows.

Dr D. S. Lamb presented a paper on "Mummies and Mummification, Especially of the Brain." (This paper appears in the *American Anthropologist*, Vol. 3, No. 2, pp. 294–307.)

Dr A. R. Spofford, Assistant Librarian of Congress, presented a paper on "Early and Rare Books Relating to American Indians." (Dr Spofford's paper appears in the *American Anthropologist*, Vol. 3, No. 2, pp. 270–285.)

Meeting adjourned.

H. L. BARTLETT, *General Secretary.*

May 18, 1901

The 320th regular meeting of the Anthropological Society was held in the assembly hall of the Cosmos Club, Vice-President Lamb in the chair. Minutes of the last meeting were read and approved.

The early part of the evening was devoted to memorials on members lately deceased: Memorial on Dr Samuel Claggett Busey, by Dr D. S. Lamb; on Col. F. F. Hilder, by Mr W J McGee; and on Miles Rock, by Mr William Eimbeck.

A paper on "West Indian Idols and Totemism" was read by Dr J. Walter Fewkes.

Meeting adjourned.

H. L. BARTLETT, *General Secretary.*